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More Rural Telephone Needed—Likewise Better Service

One of the largest electric light and power companies operating in the Middle West reports that during the first eight months of 1930 its rural sales increased nearly 47 per cent over the same period in 1929. Considering general business conditions, this is a remarkable showing and indicates that, regardless of dull times, the right kind of salesmanship succeeds in interesting the farmers in progressive methods and labor-saving devices.

This may be said to constitute a challenge to telephone companies dealing with the rural telephone service problems. They have found their farm subscribers difficult to deal with largely because they have been too long accustomed to inadequately low rates, and too low rates naturally tended to poor service. The business depression, which lowered the price of farm products, added to the difficulties of a situation which was bad enough before.

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However, the fact remains that, if the Middle West Utilities Co., between January 1 and September 1, 1930, increased its rural sales of electricity nearly 47 per cent, telephone men should feel encouraged that the rural telephone situation can be materially improved.

The more familiar the farmers become with electrical power devices, the more will they appreciate the necessity of adequate service rates; and this development will strengthen the arguments of those who supply them with telephone service that out-of-date rates must mean antiquated service. Also that slightly higher rates mean a much better grade of service.

If rural subscribers are to have telephone service as modern and efficient as the rest of their electrical service, they must pay commensurate rates. The power companies now entering the rural field can learn a lesson from their telephone brethren who were the pioneers in bringing the farmer modern conveniences, and can maintain their rates on an adequate basis from the start.

Forty years ago a dollar meant more to everybody than it does today, and the low telephone rates offered the rural subscribers at that time did not seem so out of proportion as they do today. But all rural telephone companies will agree that it has been a tough job to adjust their farm rates to conform to rising costs and other changing conditions.

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There is plenty of room for more telephone development in the rural districts. Experience has shown that business depression and unemployment do not hit the farms and the smaller communities as hard as the large centers of population. The rural sections and small towns are more self-sustaining. They are more independent of industrial prosperity. The records for this year will show more cancellations of telephone service contracts in the big cities, in proportion, during the dull times than there were in the country districts.

That this is relatively true in the other public service fields is shown by the fact that while the Middle West Utilities Co. reported approximately 47 per cent gain in rural sales of electricity during the eight months cited, its figures showed a gain of but 6.2 per cent to the large industrial power users.

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The fertility of the rural field for greater development by companies supplying telephone, electrical and other utility services is recognized by far-sighted leaders who, perhaps, have grown a little weary of concentrating on the big city problems. Regardless of the reported trend of population from the farm to the city, the conviction is growing that rural opportunities have been neglected in the past, and will yet come into their own.

Along this same line a comment made by H. M. Knipfel, the commissioner of agriculture for the state of Wisconsin, is of interest. Said he:

"The standard of farm life in Wisconsin today is closer to that of the urban population than it has been at any previous time. This is certainly some indication that agriculture is still worth-while. Thousands of farms and farm homes are being electrified every year. A large percentage of them are equipped with modern plumbing.

The modern radio, telephone and cheap automobile transportation because of good roads, with winter snow removal, are going to make it possible for the farm fam-

ily to have every convenience of the city family and go anywhere at any time. This, together with a certain amount of independence enjoyed by people living outside the crowded districts, will make agricultural land more popular in the future."

This can be said of rural conditions in many other states. So far as the telephone business is concerned, the real problem is to induce the farmer to classify his telephone with his automobile and other conveniences, and be as liberal in paying for the service.

It is a good sign that increased effort is being made by various telephone interests to study the rural line development with a view to improving service, replacing obsolete equipment and putting rates on a real basis. The subject will come in for a great deal of discussion at the state telephone conventions to be held during the coming months, and definite results will undoubtedly follow.

State telephone associations should invite representatives of the state granges, farmers' cooperatives and other rural organizations to attend these meetings and participate in the plans to inject more efficiency into the operation of farm lines.

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Not long ago TELEPHONY described the way in which the San Marcos Telephone Co., San Marcos, Texas, is proceeding with the rehabilitation of its rural connections. Manager Merton Swift's plan of taking over the subscribers' lines and setting up a schedule of rates providing for modern service, has resulted in more satisfactory service to the subscribers and considerable increase in revenue to the telephone company.

The entire job cannot be done over night, but in that part of Texas the plan seems to be a step in the right direction.

COMING CONVENTIONS

Missouri Telephone Association, Hotel President, Kansas City, November 18 and 19.

Canadian Independent Telephone Association, Prince George Hotel, Toronto, November 25 and 26.

South Dakota Telephone Association, Cataract Hotel, Sioux Falls, January 13, 14 and 15, 1931.

Nebraska Telephone Association, Lincoln, Hotel Lincoln, February 10, 11 and 12, 1931.

Texas Independent Telephone Association, Fort Worth, Texas Hotel, March 17, 18 and 19, 1931.

Iowa Independent Telephone Association, Hotel Fort Des Moines, Des Moines, April 7, 8 and 9, 1931.

Indiana Telephone Association, Claypool Hotel, Indianapolis, May 6 and 7, 1931.

Pennsylvania State Telephone & Traffic Association, Hotel Penn Harris, Harrisburg, May 26, 27 and 28, 1931.

In Oklahoma, the Southwestern Bell has been making an investigation of the farm telephone situation which so far has shown that there is a great need for more telephones in the rural districts and, of course, also for a better grade of service. It has been discovered that while over a million people of the state live on farms, they have only approximately 68,000 telephones. This is less than seven telephones per 100 population, where in the cities and towns of the state there are 20 telephones per 100 people.

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On account of his isolation, the farmer needs good telephone service more than the city dweller, it is logically argued, and there is a real field for greater telephone development in rural Oklahoma. The Southwestern Bell's study shows that most of the 68,000 rural telephones are owned and maintained by the farmers, with the usual consequences that the equipment is badly run down; that there are too many telephones on a line to give satisfactory service, and that the switching rates are utterly inadequate to secure efficiency.

A comparatively small number of Oklahoma farm telephones are owned and maintained by companies, but the rate received—averaging $1.50 a month, and dating back to pre-war times—has been so inadequate that they have not tried to develop the business. Better rates must be secured if the rural telephone service—now the weakest link in the communication chain—is to be properly developed; and the first important task is to educate the farmer to pay better rates for a better service.

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R. J. Benzel, Southwestern Bell general manager for Oklahoma, sizes up the situation by saying:

"For many years we have tried through farmer line meetings and actual demonstrations, to educate the farmer to handle his telephone business properly; and, although considerable may have been accomplished in isolated cases, the general condition of the service lines in Oklahoma still remains unsatisfactory.

We have finally been led to the conclusion that the farmer cannot be made a telephone man; and if he is to receive adequate and dependable service, the telephone companies must furnish, own and maintain the entire line and equipment."

This statement seems to be along the ideas of Manager Merton Swift of Texas.

Toll Line Construction Requirements

Switching Plan, an Excellent Treatment of Engineering Problem—Toll Plant from Standpoint of Dollars Invested to Produce Service and Earn Revenue—Two Requirements of Toll Plan—Address Before National Convention

By H. H. Wheeler, Jr.,

Chief Engineer, Lincoln Telephone & Telegraph Co., Lincoln, Neb.

I am asked to talk to you with reference to the problems that face an Independent telephone company owning toll lines when it attempts to keep up its end of the toll business. To fit in with the program, I assume that it is desired to discuss such problems from an engineering angle.

That does not necessarily mean we must resort to such terminology as echo suppressors, attenuation, milliamperes and decibels, to the utter disregard of monosyllables and more generally understood terms. That does not mean confining our problem to structural detail or technical aspect. That does not mean that we must recite a collection of data and statistics. That does not mean a careful avoidance of operative or economic consideration. What then does it mean?

Because of the widespread activities of engineers, generally, and the state of flux

of their categories, the task of defining engineering has been almost insuperable. It is always more difficult to say things in few words than many, which may account for what may seem to be an unnecessary departure from this subject, but which is really vital to it.

Any number of definitions of engineering have been offered, but they err by being too all-inclusive or by lacking in range. One definition, likewise subject to criticism, is this: "Engineering is the science and the art involved in the processes of developing and using, especially by means of machines, structures, and organizations, the forces and resources of nature, for the economic service of man."

To this there may be objection but probably more objection than improvement. It will serve its purpose here. It is not offered with any professional pride, nor in any effort to over-emphasize any particular field of telephone work.

It is obvious that by this definition, telephony *is* engineering, just so much so as it is the science and the art involved in the process of developing and using, especially by machines, structures and organizations, the forces and resources of nature for the economic service of men. And note that by the adjective "economic" which qualifies the word service, all of the so-called "business" elements are succinctly included.

What this really means, as applied to the telephone field, is that its engineering is the product of no one group or division, but rather the accomplishment of all. If this is so, and we submit that it is, it follows that this overall view must be narrowed, that we must particularize, that we must focus with greater definition in order to remain within the precincts of what is more ordinarily termed engineering.

This involves some subtractions. Important as its contributions have been from the very beginning, and increasingly so with the complexity of the business, let us subtract the laboratory procedure commonly called research. Necessary as it is in the application of the results of research to the creation of modern telephone facilities, let us subtract the highly-specialized technical performances. Vital as they are to any business, let us subtract the usual business considerations—all of the economic ones cannot be omitted—and then look at the remainder.

What we then have left is not so very far from the nominal engineering of the average operating telephone company. We have removed the spectacular and the sensational, for there is little glamor connected with the usual every-day physical problems of an operating telephone organization.

This residue is a good deal like the old-fashioned all-purpose doctor's job. There are troubles to be diagnosed and treatments to be applied. It takes on a critical turn because error must be recognized before improvement can be made. There must be intimate familiarity with service requirements and full knowledge of the available facilities for rendering it. There must be orderly analysis of the possibilities of treatment and close comparisons of alternative means of administrating them.

Service-rendering facilities may become quantitatively short—we say inadequate—they must be enlarged or supplemented to keep pace with growth. Such facilities may become physically impaired and unable to satisfactorily carry on, even though no more greater demand upon them is made than formerly; they must be renewed.

"Toll Lines," Says Mr. Wheeler, "Are Not Different Fundamentally From Any Other Form of the Telephone Plant. They Represent Invested Dollars to Produce Service and Earn Revenue."

They may become old-fashioned, good enough in quality and quantity for former use, but in respect to changing times no longer useful; we call them obsolete. They must be reinstituted with the modern.

Methods likewise are in striking parallel. Former schemes and systems, good as they may have been, can become overloaded and utterly inadequate. Plans that once were acceptable become outworn with time. They must be revised and replaced to advance with the altered conditions, the increased demands, the newer way.

It is the scientific treatment of this work and these problems that makes it engineering—engineering in the sense of our definition, but restricted to the more practical aspects.

Now what is this much referred to toll switching plan, which gives rise to a renewed interest in the whole matter of toll facilities, and which we have approached with the caution of so much introduction? Nothing more than an excellent treatment of an engineering problem, simple in fact, however broad in scope. I say treatment, meaning a present answer promising satisfaction for future requirements.

It seems quite unnecessary to recite the provisions of the plan. Promulgated early last year and repeatedly described by its authors and others, we are well acquainted with its proposals. We are familiar with the selection of its eight directly-connected regional centers; its approximately 150 primary outlets with direct connection to at least one regional center, and with one another, so far as may be practicable within limited areas; and with its provision for direct circuits from every toll center to at least one primary outlet.

We all understand that by its arrangement any toll center can reach any other within the same region with a maximum of three switches, and can reach any toll center in any other region with a maximum of four.

There is possibly less acquaintance with the transmission standards which the plan sets up, but there is general understanding that the proposed limits of transmission are designed for substantially higher grade service. The basis of the whole arrangement strikes definitely and hard at the most troublesome factors of the toll service, namely: the present lack of speed and liability to interruption of multi-switched business, and the lack of adequate and more uniform levels of transmission.

There is nothing revolutionary about it. Rather it is evolutionary. Unnamed and unheralded, to no small extent, its features have been wrought into the general toll system of today.

It is the universal application that is relatively new: the determination of the advantages in complete conformity. It is wholly an idea for the full accomplishment of universal service in accord with present-day service demands and standards.

It could not have been successfully undertaken before the more recent technical advances for obtaining transmission gain and the newer developments in type of plant with which these are associated. Quite naturally it comes as the result of need, the reflection of demand. It reaches out beyond the properties of the associated Bell companies, and necessarily includes all others which play a part in the national toll system.

As a result of this inclusion, certain requirements must be met. In this statement we seem to have approached the carded title of this discussion. We do not propose to use it merely as a point of diversion. But neither do we propose to undertake the impossible by attempting to recite in terms of plant and equipment the reflections of these requirements. The variations are so extremely wide and so definitely dependent upon particular situations and conditions that any discussion of them at such time and place as this must be in general terms.

Ordinarily generalization is discouraging. We are so often the victims of it. Your observation, like mine, has probably fre-

quently disclosed that both individuals and institutions have failed in important objectives, not so much because they lacked in general vision of their undertakings, as because they were troubled in the enactment and perfection of the more detailed performances which are essential to desired result. It is these details with which we are unavoidably concerned, but we can view them in a broad light which may perhaps reveal their susceptibility to intelligent handling.

Toll lines are fundamentally no different from any other form of the telephone plant. They represent invested dollars to produce service and earn revenue. They are subject to the same handling from an engineering standpoint as any other category of plant.

It is desired to emphasize this, to prevent them from standing aloof, from appearing to be a thing apart, and necessarily treated in a different way. Full recognition of this absence of difference and a review of the requisite process for meeting plant needs generally, may serve to point the way to meet the requirements for any particular division of plant, be that what it may.

Two Classes of Plant.

The continued operation of a telephone property involves two separable classes of plant. One is the type in which the unit of plant may be said to be a unit of service. A subscriber's loop in open wire, a telephone instrument, a drop pole, are common examples of this type or class. Little forethought is required to get these items into the plant in an orderly, satisfactory way, beyond the mere requirement for the supply of material and labor involved.

The second class of plant is that which contains many, in a single unit of plant, of what may be called units of service; or may be a unit of plant common to any number of units of service. There is illustration of this class or division in central office buildings, in switching equipment, in pole lines, and in cables. It is the supply of this plant that requires study, that involves a sound and orderly process of introduction into the telephone property.

With any and all of this common or composite plant, the total amount of earnings it is possible to realize from its construction depends upon the number of service units ultimately accommodated during the life of the plant. Up to date, almost universally, service units have been either growing or multiplying, and the anticipation of that growth is a paramount consideration. By reason of it we appreciate that during the early part, the first portion, of the service life, the costs of ownership may exceed the earnings; but if the plant is planned for the correct period, the earnings during its later life serve to compensate for the lean period and become sufficient to produce a reasonable average return throughout the whole.

This quite desirable condition can to a large extent be predetermined; and when it transpires, the service life may be correctly termed the "economic period of fill," with the understanding that the period of fill is the length of time between the date on which the plant is placed in service and the date at which it may need to be relieved because there has been complete absorbtion of its service-giving possibilities.

Capacity of Plant.

This economic period is the chief guide in selecting the size or capacity, rather than the type of the plant; and the period itself is governed by the several considerations of the method of future relief, the maximum fill, the expected service life, the rate of growth, and the annual cost incident to the ownership of the plant.

To be well-designed, the capacity of the plant must be subject to a definite plan for future relief and this consideration is as much a part in the design, in turn, of measures for relief, as in the design of original facilities. This supplementing, or relief, takes one of three forms, and the preferable choice between them is usually more dependent upon local conditions than upon comparative costs, although economy may assist the decision.

It can be obtained by creating a new plant in other situations, with the diversion of a part of the load from the old to the new. It may be done by reinforcing the existing plant with additional plant in the same location, as we say, along the same route. And it may be accomplished by the replacement of existing plant with a new and larger plant, either in the original location or elsewhere. However it may be done, it has direct relation to the whole scheme, because of its effect in supplying additional facilities at such future time as they may be required.

The maximum fill is that portion of the rated capacity of a unit of plant which may be safely used without jeopardy to the continuity of the service. The necessity for allowances for surpluses of facilities is known to all of us. It runs all the way from floor space to cable pairs, and in some types of plant assumes a place of sufficient importance to warrant fully careful computation.

The service life of a plant unit is its period of useful service in one location. That period is determined by those familiar factors of depreciation, physical deterioration, inadequacy, obsolescence, and public requirements.

Costs of Ownership.

The costs of ownership are old friends too. We call them the annual charges, and they run to depreciation, interest, taxes, maintenance, insurance, administration; and in short, the plant operating expenses. In cost comparisons, it is these costs rather than the first costs of installation that are most interesting.

But of most importance in these several factors which bear upon this proper period for placing plant, is the expected rate of growth. It is this importance which has given impetus to the constantly improved and refined methods of analyzing probable future demands—the commercial surveys, the market analyses, etc.

It is the complete study of these components of this economic period which is essential in planning a telephone plant which can and will produce reasonable earnings over any long time period. It is the kind of planning which allows rearrangements to care for changing conditions to be economically made. It is the basis upon which a definite standard of service can be maintained.

While it is more readily apparent that this planning process is applicable to individual projects, to the problems of the single exchange, or the separately operated property unit, it is precisely the same process and the same theory that should govern the localized toll plant, and has governed the general or national toll switching plan.

Two Requirements of Switching Plan.

As the plan comes to us, there are two principal reactions, two problems, or if you please, mandates, if we are to make full contribution to its complete success. The first is the necessity for establishing between toll centers and primary outlets the required number and character of circuits. The second is the necessity for bringing the toll terminal losses—i. e. the losses incurred between the subscriber's station and his toll center—within the prescribed limits of transmission.

Let us consider this first requirement: The facts are, of course, dissimilar in different areas, but there are some fundamental things characteristic of all. The primary outlet points are where they are because of the already large flow of traffic to and through them. It would be a poor plan if it were not so. Therefore, in large part these circuits now exist.

It can be expected that in the application of the plan to any company's territory it will be desirable to rearrange the toll center layout. Advantages in the rearrangement in many cases indicate the discontinuance of some toll centers. Again the affected company's conformity has to be planned, with the introduction into the plan of those several elements of planning which we have mentioned.

Without more definite and precise information I cannot say that our own case is typical, but there are reasons to assume that the Lincoln company's situation is not unlike some others; and it certainly contains many of the elements of any company's problems.

We now operate 31 points as toll centers. Of these 31, 16, or more than half, are supplied with circuits to what will be primary outlet points. Of the 15 not so supplied, it appears that as many as eight can be discontinued, leaving only seven not now directly connected as the plan would

have them. And it is further evident that of these seven, in the case of all but two, the required direct circuits could be justified on the basis of present traffic.

That does not leave a baffling job, an heroic undertaking, to supply them. In proportion to the present operated toll mileage, it is no very serious consideration.

No comment is made regarding the necessity for facilities between or beyond primary outlets, because insofar as we are able to discover, no more than two primary outlets are situated in the areas of any Independent companies. One of these is partially Bell-owned; the other is the Dakota Central territory. Over this fact, we should shed no tears, for we have long been convinced that the greater burden of cost per circuit mile certainly lies within the limits of haul which require the greater transmission gains; and we now see nothing in the whole picture upsetting to that view.

The second requirement—that for bringing the toll terminal losses down to the necessary levels or limits of transmission—is probably the most important of the two for any Independent telephone company involved. By important, we mean that it looms as the larger problem from the standpoint of required revisions, of cost of performing these revisions, and of time necessary to its accomplishment without absorbing unreasonable losses in unduly hastening the process.

One element of it is not so difficult, namely, the improvement in tributary trunks between exchanges and their toll centers. The extraordinary condition now prevailing in the metal market, with the cost of copper more nearly approaching that of iron than it has for a quarter of a century, seems to indicate a poor time for property appraisals but a good one for the substitution of copper for iron in a vast number of tributary toll lines.

The loops and trunks in exchange distribution systems, for the most part, fall fairly well in line. The liberal allowances in the terminal loss are specifically arranged to preserve the full utility of this section of the plant.

Once more the problem turns toward the rural lines, the bugbear of the service. Up to now, the rural subscribers have not been responsible for any large proportion of toll business but possibly one of several reasons for that fact has some connection with the transmission element of rural service.

Whatever may be the aggregate of these requirements in their several groups or directions, the task of meeting them demands a plan of handling, comprehensive within the operating area, but correlated with the larger scheme. In the preparation of such a plan, one most encouraging thing stands out in the toll plant. Open-wire circuits, some elements of the switching equipment, and practically all of such special service apparatus as repeaters and carrier equipment, when it may be employed, are at once both units of plant and units of service, divorcing themselves from many of the complications introduced when that is not so.

Troublemen of Home Telephone & Telegraph Co., Fort Wayne, Ind., in New Uniforms Which Installation and Maintenance Department Employes, Numbering About 60 Men, Now Wear. Uniforms Are of Dark Gray Woolen Whipcord and Consist of Trousers, Leggins, Shirt, Coat and Cap. On Cap Is Insignia Badge of Company for Identification.

There remain then, as types of plant requiring careful planning for future growth, principally the toll pole lines and central office buildings. The buildings problem is too special for our consideration here. Like other forms of common or composite plant, it must be controlled by the elements of the economic period of fill; the opportunity and means of relief, the maximum fill, the expected service life, the rate of growth and the annual costs of ownership. The only reason for the repetition of these factors is that perhaps they are more easily recognized when applied to a building than to some other classes of plant combining many units of service.

Fundamentally pole lines are simply the means by which the necessary mechanical clearances may be maintained between whatever may be carried on the pole lines. It follows that they can be dispensed with whenever these conditions of mechanical clearance can be otherwise met. But poles will remain with the telephone structure for a long time yet, perhaps always, for the reason that their function in so many instances is not so economically performed by other means.

We have made much progress in economical pole use. Timber strength analysis, combined with accurate load determinations, has taken the guesswork from pole line design. Line importance classification has contributed to the advance. Timber preservation has gone far toward maintaining initial strength, and is a long step toward a theoretically desirable condition that unfortunately is impossible of attainment, in which individual pole strengths should increase with increased pole-line loads. At any rate we may safely say that the investment in pole plant today is a better investment than it was formerly.

The troblesome problem, if there be any, runs to the factor of the expected rate of growth. This, in more definite terms, means what increased burdens will a particular line of poles be required to bear and when those burdens can be expected to come? In other words, the plant engineering end of it has been pretty well cared for, if reasonably good prediction of the circuit loads can be had. And here lies a matter of a good deal of interest.

There seems to be a convergence in the general ideas of toll and exchange traffic handling. We do not wish to pass over too lightly the constantly improved methods in computing traffic load studies, with the consequent determination of circuit requirements. Again that branch of the work has been subjected to more and more scientific treatment. But the interesting thing seems to lie with the trend of traffic handling toward quite different and certainly improved results. Somewhat roughly the story is something like this:

Time was when a toll circuit carried a normal number of daily messages with duplicated ticketing and delayed service. Then came the single ticket idea, that served to increase that message carrying capacity. Ten years later the C. L. R. operating method found introduction, and with its now nearly universal adoption, the message-carrying capacity of a toll circuit depends very much upon its busy-hour load.

In other words, the toll circuits are taking on many of the aspects of the exchange switchboard, with consequent increase in circuit requirements. This trend of decrease in the difference between the handling of the local and the toll message has been so well received by the users of the service as to further increase the circuit demands numerically. Reduced toll rates, at least in theory, should stimulate traffic with further effect in the same direction.

It is then only in the natural course that

over the routes of concentrated haul the open-wire facilities are giving way to cable. The control of these routes, so definitely fixed by the general toll plan, serves to limit the necessity for cable to those sections where it may be entirely economical. It is improbable that its use will serve to reduce the present toll open-wire mileage.

With the first announcements of the possibilities of carrier equipment, there were visions of stripping pole lines of existing wire loads. What has transpired is merely that a portion of the rapidly-increased mileage has been thus absorbed. We believe it is not incorrect to say that in spite of all the present possibilities for toll open-wire reductions, the aggregate future program calls for its increasing mileage.

But wherever the use of toll cable may be, the economical form of circuit construction, we have that change in type of plant from one in which the property unit is the service unit, to one in which the unit of property is common to a large number of service units, with its consequent complications.

At the present time the rapid development of the toll business serves to decrease the accuracy of future estimates. Coupled with probable future changes affecting operating methods, load schedules, and transmission standards, it indicates the continued use of open wire, unless and until all factors point strongly toward cable economy. The situations in which they do so in Independent company areas are certainly extremely few.

We mean not to infer that the country-wide toll cable program, calling for several hundred million dollars of investment in the ensuing five-year period, is unimportant. It is enormous, and because of the plant type change it is highly interesting. We merely wish to indicate why, for most of us, it is not a current problem in meeting our requirements.

The development of the cable itself is splendid tribute to the ability to produce plant which will successfully do the work required of it. Its use on pole lines, in various forms and kinds of conduit, or buried without conduit, together with the machinery for placing or erecting it, are ingenious developments, all calculated to fit the economical necessities of particular requirements.

The various advantages of the several construction types have been repeatedly discussed, with the principal considerations being: adaptation to right-of-way conditions, opportunity for shortening routes, for improved inductive coordination, and for promoting the life of the plant. Gas-pressure testing, and pressure operation to forestall trouble, are important contributions to cable service reliability.

Perhaps the fast-expanding cable network will extend to points now apparently remote from it. When that time comes, the present rate of progress in plant development indicates that still further advances will have taken place toward an ever-receding goal of economical construction. Just now, I dare say most of our personal problems do not reach beyond the toll entrances, so far as cable is concerned. These supply any number of tricky and delicate complications.

What we have attempted to say is only and wholly a personal opinion, not advanced by any organization or association whatever, and is substantially this:

That in general the full application of the toll-switching plan is a necessary and ultimately economical step on the part of Independent property owners.

That their obligations and requirements in connection with it lie within their ability to readily handle them.

That the plans for accomplishing it are not like merchandise—kept in stock to fit all needs—but that the model plan exists only for its individual place and condition, each problem requiring special study and individual treatment to adapt it to its singular requirements.

That the whole purpose and ideal of the industry is to increase the standards of service by the adoption of constantly widening discovery of applicable facilities and methods.

That as Independents we cannot retreat from this philosophy, and our duty is to follow where we may not have led.

Plant Value of Bell System Over Four Billion Dollars.

The telephone plant of the Bell system reached a record value of $4,050,000,000 on October 1, passing the $4,000,000,000 mark for the first time in history, it was stated recently. This figure includes only telephone properties within the United States as well as general equipment, tools and supplies, thus taking in all property used in furnishing telephone service. If the $150,000,000 plant and equipment of the Western Electric Co. be added to this total, the plant value of the Bell system and its affiliated manufacturing organization is now in excess of $4,200,000,000.

Assets of the Bell system on October 1 were in the neighborhood of $4,900,000,000, while those of Western Electric on the same date were about $375,000,000, making combined assets of the entire affiliated organization in the United States about $5,275,000,000, a new record.

This figure is without precedent for any corporation or group of properties under single management in the United States. It compares with assets of about $2,400,000,000 of the United States Steel Corp., $2,200,000,000 of the Pennsylvania Railroad, and $1,800,000,000 each of Standard Oil Co. of N. J. and N. Y. Central R. R.

Assets of the Bell system include nothing for patents or good-will, and virtually every dollar of "intangibles" has been eliminated in the system's reports. The value of the "plant" represents actually the cost to the company.

On the liabilities side the system has surplus and depreciation of approximately one-third the value of the plant. For instance, on December 31 last, surplus and depreciation totaled $1,257,000,000, comparing with plant, equipment, tools and supplies of $3,782,000,000. The system carries its investments at cost, and its only other stated assets are the actual value of receivables, temporary cash investments and cash.

It is estimated that assets of the Bell system will not surpass the $5,000,000,000 mark this year, although reaching close to that figure, but the organization is expected to become the first $5,000,000,000 system in the country in the first quarter of 1931. In its published reports, the Bell system does not include the accounts of the Western Electric Co., Inc., the Bell Telephone Co. of Canada, or of subsidiary and connecting companies, investments in which are held by the American Telephone & Telegraph Co. or its associated companies.

Figures for plant, therefore, are limited to the actual cost of the system's telephone operating and maintenance properties in the United States. Its interests over and above this directly-owned telephone plant are included only as investments, in which stocks of Western Electric, Bell Telephone of Canada and other companies are listed at cost.

In 1900 the plant investment of the Bell System in the United States was about $181,000,000 and at no time in the last 30 years has there been an abatement in its growth. The net amount added to plant last year was $395,000,000, comparing with $262,000,000 in 1928, $231,000,000 in 1927 and $258,000,000 in 1926. The smallest additions to plant since 1900 were $26,637,200 in 1908 and $28,700,100 in 1907. In each of the last eight years, net additions to telephone plant exceeded the total amount of telephone plant in the Bell system in 1900.

Officials of the company say the great preponderance of fixed plant in assets of the Bell system calls attention to a fundamental difference between the telephone industry and many other types of business. The Bell system is engaged in furnishing telephone service. It has no manufactured product to sell, no items of merchandise to dispose of and no investment in materials in process of manufacture. In short, the business does not call for a considerable amount of working capital.

Financing of the system largely is conducted through the American Telephone & Telegraph Co., but some of the associated companies finance directly through public offerings of stocks or bonds. Financial requirements of the Bell system for the current year and the early months of 1931 have been fully met, it is understood, as the American Telephone & Telegraph Co. alone has obtained about $795,000,000 additional capital in the last 18 months by various security offerings.

The Toll Billing and Public Relations

Effects of Proper and Improper Toll Billing on Public Relations and Company Revenue—Possible Errors in Toll Billing and Results—Address Given at Annual Traffic Conference of the Iowa Independent Telephone Association

By J. R. Denkhoff,

Secretary-Treasurer, Iowa Telephone & Telegraph Co., Dyersville, Iowa

In presenting this subject, it would not be amiss to give some thought to the definition of the phrase "Public Relations" as used in the public utility field. It is a phrase commonly used, but at the same time, I am of the opinion that it is often used without giving any thought to its meaning.

Taking the words separately, Webster defines public as "Of, or pertaining to the people at large, or the community." He defines "relations" as "The bearing of two or more things upon each other, or interdependence."

In other words, the phrase "Public Relations" as used in the telephone business is the "Interdependence of the community and the telephone company." To reap the greatest possible benefits from this interdependence, the telephone company must make its service such that the public or community actually feel that there is an interdependence between it and the company.

Therefore, when the community thinks well of the company and its service, and feels that there is an interdependence between it and the company, the company's public relations are said to be good. We must always remember that we cannot get along without the public, and while they cannot get along very well without us, subscribers get that impression easily unless they get the best of service at all times.

Every department of the telephone business is concerned at all times with public relations, be it the work of the construction crew, the operator, the collector, the bookkeeper or the management. This is equally true of toll billings.

This paper deals primarily with the effects of proper and improper toll billing on public relations and company revenue. We are all concerned, of course, with increasing net revenues, because even though we may not be interested in our company in a financial way, we, as employes, are better off working for a prosperous company than for one that is not well off financially.

Results of Improper Toll Billing.

Proper or improper toll billing affects public relations and net revenues in a number of ways, some of which may be summed up as follows:

Toll billed to the wrong subscriber will result in extra cost in time in handling the complaint—crediting the first subscriber and billing the subscriber who actually owes the bill. In some cases, the subscriber actually owing the bill may have moved away in the meantime. The first subscriber gets a bad impression of our method of accounting and, while the account may have been adjusted to his apparent satisfaction, he has a feeling that he must be more careful in the future regarding his toll calls and his dealings with the telephone company. He may discontinue the use of toll service entirely rather than take a chance as he sees it.

If he is very hostile or if billing errors happen several times in succession, he may even discontinue his telephone service. He may talk to his neighbors and friends about it. Some of them may not have telephone service and may have contemplated such service in their homes or places of business in the near future, and they might change their mind because of his opinion.

Importance of Toll Billing.

It is impossible to know the extent of the damage that a toll call billed to the wrong person, may do to the public relations of a company and, of course, indirectly to its revenue.

If the persons handling toll billing will at all times remember that every error that they make will affect the company's standing in the community, and very likely its revenue, such errors will be reduced to a minimum.

Of all the jobs in telephone work, toll billing is one of the most important in its connection with public relations. If a subscriber reports his telephone out of order today, and the man does not go out to fix it until tomorrow and then explains that he had other trouble ahead, the subscriber is generally satisfied. If the operator gives the subscriber a wrong number and excuses it, the subscriber usually accepts the explanation.

But just try and bill a toll call to that otherwise model subscriber, that he did not place, and see what happens. You know in this case you have affected his purse. He can see a reason for some delay in repairing his telephone, or in giving him a wrong number, but he cannot understand why an error should be made on his bill.

When errors creep into our work, thereby affecting toll billing, it is our duty to do everything possible to get to the bottom of the trouble and get rid of it, thereby transforming public opinion of us and our company.

The public viewpoint is a matter of great importance. If we want to do a good job and improve the public relations of our company, we must obtain the public viewpoint before we can get a true picture of what improvements are necessary and how they affect our revenue. I think that the public viewpoint regarding our accounting work is that the telephone company is a well-enough organized concern that it should be able to bill subscribers without error. Some people even get the idea that the company bills a certain amount of erroneous tolls each month to swell the revenue. They consider this the only reason for calls billed against them that they did not place.

It is quite impossible to get 100 per cent accuracy in all of our work, but at the same time with a little effort and cooperation errors in toll billing can be kept down to a small fraction of one per cent of the total tickets billed.

Let us next take up the detail of handling toll billing. We must have a proper method before we can dwell on absolute accuracy. A toll building control is very essential. It eliminates the possibility of any error in total billing on an exchange, and it is a great help in eliminating errors on individual accounts.

Now let us see who is responsible for correct toll billing: First of all, the toll billing clerk who actually bills the subscriber does not make all of the errors; in fact, less than 25 per cent of the total errors. Those responsible are: the local or tributary operator, the toll center operator, the rate clerk, the toll billing clerk and the subscribers' accountant. Correct toll billing requires the cooperation of all the persons mentioned.

Possible Errors in Toll Billing.

Some of the errors that may be made by the various persons responsible for correct toll billing, may be classified as follows:

1. Those made by the local operator: Failure to give toll center operator any special instructions with reference to ticket. Failure to give the toll center operator the number distinctly so that she may put the correct number on the ticket. Carelessness in noting whether or not the toll center operator has distinctly understood all of the details of the ticket. Failure to give the toll center operator the name of the calling party.

2. Those made by the toll center operator: Failure to give her full attention to the particular call she is taking from the tributary operator. Failure to write all of the necessary details on the ticket. Failure to ask the tributary operator to repeat any

LIVED DAYS

By Miss Anne Barnes,

Traveling Chief Operator, Iowa Independent Telephone Association, Des Moines, Iowa

"Now the autumn has come, and the dull brown leaves drift down into a pile of lived days." And the wind catches them up and swirls them in a circle roundabout. As they go scurrying by, we notice a few bright splotches of red and yellow among the billows of crackly brown ones.

We know that the red, yellow, and brown leaves—all of them—have lived their useful days throughout the summer. Before their turning to varied colors, they served as soft, green screens for bird homes. When the sun was ripening the grain with its ultra violet rays, the leaves furnished deep, cool shade for man and beast, fanned them with soft breezes and murmured a soothing song to them as they lingered in the shade, resting.

Autumn time! The work of the leaves is done. They fall into a pile of lived days.

We gloried in the brown-red-golden bouquets hung against the skyline this past summer, perhaps, more than ever before. At this time of the year we seem to pause a little longer than we do at other times, to look backward, in retrospection, over our summer time of lived days.

We lived them one day at a time. As single days many of them disappointed us. And we have often thought we would like to live these days over —live them better. But in the backward turning as we see them in retrospect, a brown-red-golden bouquet of lived days against the skyline of our lives, the petty disappointments folded up in a few single days lose their importance.

We are better for that backward look before pressing forward. We are a bit broader, I think, because we have dropped the "I" out of the picture.

MORAL: "A man who lives only for himself has not begun to live—has yet to learn his use and his real pleasure, too, in the world."—Woodrow Wilson.

part of the details that she did not distinctly understand.

3. Those made by the rate clerk: Carelessness in looking up rates, and in figuring overtime.

4. Those made by the toll billing clerk: Carelessness in copying details from tickets to toll bills. Failure to check total to toll bills against ticket total through proper control system. Failure to see that tickets are billed to proper subscriber.

5. Those made by subscribers' accountant: Lack of accuracy in adding toll bills to subscribers' rent bill.

6. Management: Lack of a proper routine set up for billing subscribers' monthly and collecting bills promptly.

This does not refer to any of the larger companies. However, I am quite certain that a number of the smaller companies bill toll to their patrons quarterly, or even semi-annually, and then are slow to collect the bills.

This does not have a good effect on public relations. It is harder for a subscriber to remember toll calls from three to ten months back than it is for him to remember 30 to 60 days back. If the tolls are too far back, he is also more liable to get the idea that he is being asked to pay for calls that he did not place.

We will now consider briefly how these errors affect public relations.

In case a subscriber places a call from one telephone and asks to have it charged to another and the operator fails to give the toll center the special instructions, we are very likely to have a dissatisfied subscriber.

In case the number was not given clearly and the ticket comes back with a wrong number on it, the wrong subscriber is billed.

In case the toll center does not get the name correctly. there may be a dispute on that particular call, the subscriber claiming that he did not talk to such a party, or does not know such a party.

Errors on rates, especially on calls on which there is some overtime, are the cause of much dissatisfaction.

Errors in addition are plain carelessness and give the subscriber a very bad impression of the methods of the company as a whole.

When an unavoidable error does occur, it is our duty as employes, to be loyal to our company; and this means treating the company's patron in such a way that he will go away satisfied with the explanation you have given him, and have a better opinion of the company, its policies and its employes. In order to do this, you must handle all complaints in a courteous and cheerful manner. Even if the subscriber is irritated about the matter, continue to be cheerful, and in most cases you will eventually win him over.

After all, toll billing and its effect on public relations is just a question of loyalty to your company **and** your job, thorough knowledge of the work you are doing, cooperation with your fellow employes, cheerfulness in dealing with the public, and "service with a smile," all of which may best be summed up in these words:

One sadly sees the setting sun,
And views his day's work with a sigh;
The other drops his tools to run,
Nor cares how little he has done;
And people still go asking why
Some men are down and some are high.

Missouri Convention Program Includes Interesting Speakers.

There is every indication that the Missouri Telephone Association Convention at Kansas City on November 18 and 19 will have the largest attendance on record at the present time.

Arrangements have been made with "Dick" Smith, managing editor of the Kansas City Journal-Post, to appear on the program and deliver an address. Recognizing the great part played by the newspapers in moulding public opinion, the Missouri association has asked Mr. Smith to talk about the telephone people from the newspaper man's viewpoint. This is expected to be a very interesting number.

R. B. Still, formerly president of the Texas Independent Telephone Association, will talk about "Telephone Associations Here and There."

L. C. Oberlies, of the Lincoln Telephone & Telegraph Co., Lincoln, Neb., who made such a hit last year, will speak on, "What Is This Personnel Business?" Remembering his fine talk at last year's convention, an excellent address is anticipated.

F. B. MacKinnon, president of the United States Independent Telephone Association, Chicago, will talk on "National Telephone Problems."

Also on the program will be demonstration of first aid methods under the supervision of C. H. Weiser, plant personnel supervisor of the Southwestern Bell Telephone Co.

The linemen and troublemen's conference under the direction of J. J. Cline, chief engineer of the Middle States Utilities Co. of Missouri, and the operators' conference, in charge of E. F. Carter of the Missouri Telephone Co., Columbia, are expected to be "bigger and better" than they were last year.

The annual banquet, entertainment and dance will be held on the evening of November 18. The association, of which R. W. Hedrick, of Jefferson City, is secretary, promises there will be "plenty doing" at that time.

Prices in the Metal Markets.

New York, November 10: Copper—Quiet; electrolytic spot and future, 9½c. Lead—Steady; spot, New York, 5.10c; East St. Louis, 4.95c. Zinc—Quiet; East St. Louis spot and future, 4.40@4.45c.

Here and There in Telephone Work

Road Signs of Automobile Club Indicate Public Telephones.

Road signs now issued by the Automobile Club of Washington indicate public telephone locations to the Washington motorist. The club has placed signs along the highway at proper places, pointing the way to the nearest pay telephone and in some instances giving the distance. These signs are placed when the sign crews start out in the spring.

Highway Signs Indicating Nearest Pay Telephone.

The rendering of this added service to the tourist has been accomplished through the cooperation of the Automobile Club and the Pacific Telephone & Telegraph Co., and is materially aiding in impressing favorably thousands of traveling motorists.

Swiss Development Association Interested in Campaigns.

Frank V. Newman, commercial superintendent, Commonwealth Telephone Co., of Madison, Wis., was recently surprised to receive a sealed package from abroad. Upon opening it he found it to contain a letter from the Swiss Telephone Development Association, Zurich, Switzerland.

Mr. Bellmont, the association's advertising manager, had read the summary of Mr. Newman's talk on the "Add-a-Phone Canvass" before the convention of the Wisconsin State Telephone Association, which appeared in TELEPHONY of August 16. He was greatly interested in the canvass and wrote Mr. Newman asking for a complete set of the different pieces of literature utilized in that campaign. Needless to say, copies of the various advertisements, cards, bulletins, sales letters, bill stuffers, inserts, etc., were promptly mailed to him.

In his letter to Mr. Newman, Mr. Bellmont enclosed samples of sales letters and leaflets issued by the development association and used in Switzerland. The leaflets are printed on a very good grade of paper with excellent illustrations showing the installation of wall sets to which the cradle type handset is connected. Other illustrations show the operator making connections in the multiple, underground cable installation work in the mountains, and open-wire construction with a view of also showing what heavy snowstorms do to it.

One of the sales letters had some excellent halftone illustrations of subscriber installations in various places. It is to be noted that each one of these installations has the cradle type telephone.

The material received by Mr. Newman indicates that Switzerland is abreast of modern advertising methods for promoting the sale of telephone service.

P. B. X. Operating Current Supply; The Storage Battery.

By JOHN A. BRACKEN.

Storage batteries are of two general kinds—lead, and the Edison or nickel-iron. The lead storage battery is the kind most generally used in all telephone work.

The elements of a lead type storage battery used for the purpose of supplying operating electric current to a P. B. X. comprises both the characteristics of a voltaic cell and those of an electrolytic cell in that the storage cell may be used over and over again by being alternately charged and discharged.

A storage battery does not, as is sometime supposed, store up electricity. In fact, this is no more true than the main spring of a watch can be said to store up time. What the spring really stores up is muscular energy; that is, the muscular energy stored in the spring when wound up is put in such a form that it can perform work and produce a means of estimating time.

The idea of "storing" an electric current comes from the fact that if a current is sent through a cell for a certain length of time, at a later time a current can be drawn from the cell for almost the same length of time. From this it may be said that a storage battery is merely a device for storing up energy—by changing chemical into electrical energy when discharging, and changing electrical into chemical energy when charging, the two actions being entirely reversible.

There are four essential parts composing the P. B. X. storage battery: The positive and the negative plates, known as the elements; the electrolyte, consisting of sulphuric acid and water; plate separators of specially-treated wood or of hard rubber; and the containing vessel, usually glass or hard rubber jars.

The principal active parts of the storage battery—that is, the positive and negative plates and electrolyte—are composed of various combinations of four primary materials or chemical elements: Hydrogen, oxygen, sulphur and lead. Lead, however, is not a compound, but is a soft, heavy ductile, bluish-grey metal whose chemical symbol is Pb, taken from "Plumbum," the Latin name for lead.

The chemical symbols of these four parts are: Hydrogen, represented by H; oxygen, represented by O; sulphur, represented by S, and sponge or pure lead, represented by Pb.

Combining these into a combination of formulas: Ph O_2 indicates peroxide of lead; Pb SO_4 indicates sulphate of lead; H_2 SO_4 indicates sulphuric acid; and H_2 O indicates water.

There are many types of P. B. X. storage battery plates in use. Each maker claims some special advantage for a particular plate, but the material in the plates is about the same for all makes used for telephone service. The plates are usually constructed from very thin frameworks called grids, which are made of lead alloyed with a small quantity of the metal antimony. The object of adding the antimony to the lead is to give stiffness and strength to the grids.

The plate which is positive on discharge is thickly coated with lead peroxide. It has a brown color, which during charge changes to a deeper brown or chocolate color. The negative plate is slate colored. It consists of a grid like that of the positive plate, in which is placed finely divided and porous lead in granulated form, to allow free circulation of the electrolyte through the plate and that all the finely divided lead may be reached. In this way the active lead is made to retain its porous nature without any danger of being broken up or separated.

In order that the greatest electric current output of a storage cell may be obtained, it is necessary that a large plate surface be exposed to chemical action during charge. This is brought about by special attention being given to the structure

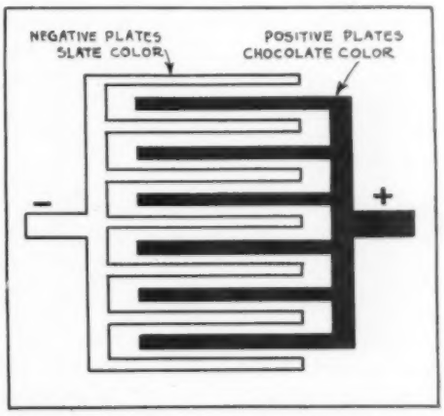


Fig. 1. Alternate Arrangement of Plates in the Storage Battery Cell.

of the plates and by connecting a number of positive plates to a single lead cross bar, and doing the same with the negative plates. The plates are arranged in this manner so that the electrolyte can reach and act upon a large amount of plate surface. There is usually one negative plate

or more than there are positive plates in a group.

These sets of plates, positive and negative, are arranged alternately as shown in Fig. 1, so as to form the terminal electrodes or poles of the cell.

The storage battery is sometimes called a chemical pump which under certain conditions produces an electrical pressure. This is mechanically illustrated in Fig. 2. Here the pressure is created by the water pump at *P* which operates under the weight, *W*.

When the back pressure becomes equal to *W*, the pump stops and maintains this pressure until it is lowered by opening the valve, *V*, which corresponds to the exterior circuit connected to a storage battery. When the energy stored in *W* is ex-

Fig. 2. Hydrostatic Analogy to a P. B. X. Storage Battery.

hausted, the difference in pressure is zero and no water flows from + to —. The action is practically the same in the storage battery.

"Mohawk" Possibly Last of Central Office Names in New York.

The last name to be added for probably many years to the roster of nearly 200 telephone central office names in New York City will be "Mohawk," which will be introduced in Manhattan before the close of the year.

In the future, as additional central offices are needed, new names will seldom be required. This is because under the modified designation plan, to be introduced in December, each existing office will be designated by the present name and a numeral. As additional offices are established in the same general neighborhood they can be given the same name, but with a different office numeral.

With the adoption of the name "Mohawk," therefore, there will come practically to an end the laborious search for serviceable names in a city whose growth has nearly exhausted the available total, which is limited because of the requirements of practical use.

Although the modified designation plan will mean only a slight change from the present method of making calls, the New York Telephone Co. is conducting an extensive educational program, through personal visitation, printed instructions, and public advertising, so that every telephone user may be fully informed and the change made without inconvenience to the public generally.

As a large part of the city's telephone traffic involves its 36,000 private branch exchanges located in business houses, hotels, apartment buildings, etc., the company points out that much of the ease with which the plan is put into operation will depend upon the cooperation of the approximately 40,000 attendants at these switchboards.

For this reason the company plans to give personal instruction to as many of these attendants as possible, particularly those at the larger switchboards, before the introduction of the plan.

Because of the large number of individuals and concerns using their telephone numbers on stationery or otherwise, the company has suggested that they may wish to bear the forthcoming change in mind when ordering supplies for use after the end of the year. The new central office designations are included in booklets which already have been supplied to nearly all subscribers. The introduction of the plan will not necessitate changes in telephone line numbers.

"I Wonder Why" of an Observing Traveling Telephone Engineer.

By Ray Blain.

I wonder why more companies do not take advantage of telephone conventions for the purpose of instructing their plant forces?

It is a common thing for companies to send their local managers and officials to conventions, but few of them seem to think that it is necessary to send the plant men when, in reality, they are the ones who would derive the most benefit from them.

At the national convention in Chicago recently some of the leading engineers of the Independent field gave interesting and instructive talks which were of real benefit Then the demonstration by S. P. Grace of the latest developments in the Bell laboratories was not only instructive but would give ideas to all alert plant men.

The exhibits of various manufacturers of all latest improvements in equipment and material, with their experts on duty ever willing to explain each feature in detail, were an endless source of good reliable information that could only improve all men willing to take advantage of it.

First we see automatic equipment, both switch type and all-relay, with working units demonstrating the latest features including the time-giving machine and fire alarm systems.

The very latest in manual equipment was shown, including the new monotype switchboard where all the equipment for a 200-line exchange is confined to a space not much larger than that formerly occupied by the switchboard alone. Radio and program service equipments were demonstrated to advantage.

Solder of different kinds and its application to certain classes of work was demonstrated and explained by experts who could convince you that soldering can save us money.

Different types of line trucks and earth-boring machines were shown and explained to the delight of all. The earth-boring machines can be really appreciated only by men who have used a long handled digging set. They know labor is saved.

Some very interesting new features have been developed in cable terminals and protector equipment which were explained to advantage.

The new sealed type storage batteries with built-in gravity indicators and thermometers were much in evidence and made a great hit with everyone. Battery trickle chargers for the small exchange were on display with a man in charge who could prove that their principle is right.

Many new items have been added to pole hardware which make a number of jobs easier and better.

Clay conduit, its new applications and advantages were well explained.

New type ringing equipment was shown and explained.

Cable-testing equipment was explained so well that we came home and located some trouble which had been bothering for a long time.

Blow torches and fire pots which will work were on display. Several new features have recently been added to these tools.

Different type patent anchors were shown and explained in detail.

All types of telephone wire and cable were on display. All types of cable rings, some new, were shown.

Tools, from a new type plier to a pipe pushing machine, were on exhibit.

Yes, the Chicago convention, or in fact any convention, is of special interest and benefit to all plant men; and any company will do well to take advantage of one or more to instruct its plant force.

SAFETY DOCTRINES.

By John A. Bracken.

Rule-O-Thumb.

Rule-of-thumb methods and lack of proper training and skill in the practice of safety in the telephone plant are factors which tend to increase rather than reduce avoidable accidents.

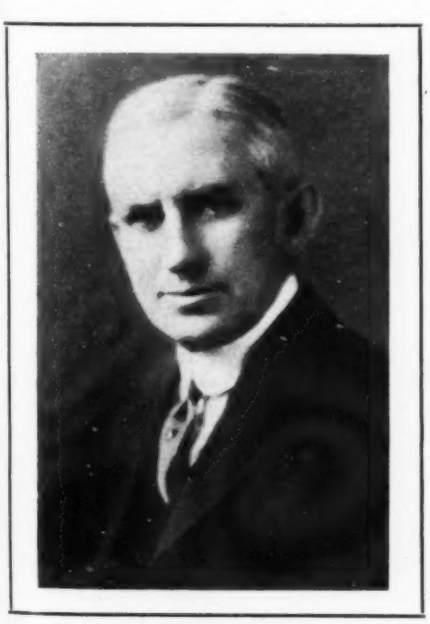
Personal Notes from the Field

Frank L. Schuyler, one of the best known telephone men in Iowa, has retired from service after 34 years with the Northwestern Bell Telephone Co. He has been in the traffic department all of that period, and was at one time district traffic chief at Sioux City. When he resigned, he was in charge as district traffic superintendent at Mason City, Iowa.

Burch Foraker, of Detroit, president of the Michigan Bell Telephone Co., was elected president of the Telephone Pioneers of America at the convention last month in Los Angeles.

Mr. Foraker has been president of the Michigan Bell Telephone Co. since July, 1926, since which time approximately $130,000,000 in new plant has been added to the state's telephone system.

The new head of the national pioneer organization entered the employ of the Bell system 37 years ago, with the New York Telephone Co. He developed into one of the outstanding telephone plant builders in the Bell system and is credited in large part with the construction of the largest telephone system serving any city in the world—Manhattan Island, New York. He began telephone work as an



Burch Foraker, Who Commenced as Installer for New York Telephone Co. in 1897 and Now President of Michigan Bell Telephone Co., Is the New President of the Telephone Pioneers of America.

installer and labored in every division of telephone plant work.

J. S. McCulloh, president of the New York Telephone Co. is the retiring president of the Telephone Pioneers of America.

Jay G. Mitchell, Who Is Now General Commercial Superintendent of the Associated Telephone Utilities Co., Madison, Wis., Has Had Wide Experience in All Branches of Telephone Work.

Jay G. Mitchell, who for more than a year has been connected with the Associated Telephone Utilities Co., Madison, Wis., is now general commercial superintendent of that organization.

Mr. Mitchell, who is well known to TELEPHONY's readers as the author of "TELEPHONY's Home Study Course for Telephone Men," now in book form, and other articles, has had wide experience in telephone work. Prior to his connection with the Associated company, he was for eight years secretary-treasurer of the Illinois Telephone Association, going to it from the position of engineer of the Illinois Commerce Commission.

In 1893, Mr. Mitchell first began his career in telephone work as a student inspector and had years of experience in operating, manufacturing, sales and engineering work which prepared him for his work with the Illinois commission and the Illinois Telephone Association. His wealth of experience with these two bodies well qualified him for his new duties with the Associated company.

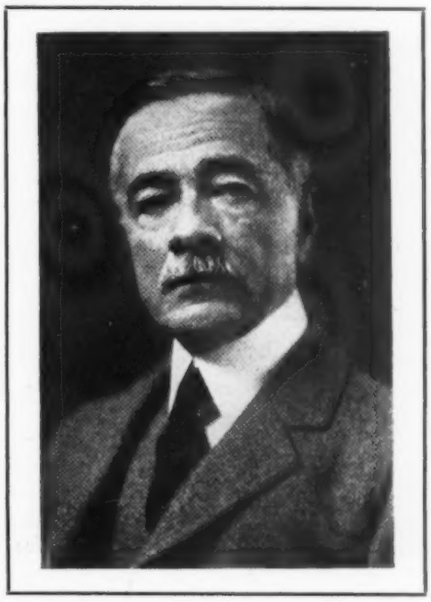
General John J. Carty, who recently retired as vice-president of the American Telephone & Telegraph Co., has been honored by the company in a way to make certain that his name will always be connected with scientific achievements.

The National Academy of Sciences has been presented with a trust fund of $25,000 by the American Telephone & Telegraph Co. to establish "The John J. Carty medal and award for the advancement of science." This fund was presented in appreciation of the outstanding contributions to the field of science in general, and electrical communications in particular, made by General Carty during his career in the employ of the Bell system.

It has been announced that the medals and accompanying financial recognition made possible by the income from the trust fund will be awarded at least not oftener than once every two years "for noteworthy and distinguished accomplishment in any field of science coming within the scope of the Academy's charter."

General Carty himself is in possession of many of the highest awards in engineering and science. Often referred to as "the dean of telephone engineers," General Carty either invented himself or improved upon available devices contributing essentially to the building of a telephone structure of the scope and efficiency of the system now serving this country.

Among other major achievements, he initiated and pushed to a successful conclusion the work necessary to make transcontinental telephony possible. He likewise inspired and directed the work which resulted in the sending of the first articu-



General John J. Carty, Who Retired July 1 As President of the A. T. & T. Co. in Charge of Research and Development, Has Often Been Referred to as the "Dean of Telephone Engineers."

late words across the Atlantic Ocean by radio telephone 15 years ago.

Participating with the American Telephone & Telegraph Co. in the creation of this new honor is a group of Bell system officials who have been the close associates

of General Carty in the administration of the American Telephone & Telegraph Co. during the last years of his active connection with it.

These officials are personally providing funds for the design of the medal, the permanent dies from which medals awarded by the Academy can be struck, and the cost of the first medal awarded. The design of the medal is to be the work of an eminent American medalist.

Entering the Bell system in Boston in 1879, General Carty went to New York eight years later with the Western Electric Co. in charge of the cable department in the east.

In 1889 he went to the Metropolitan Telephone & Telegraph Co., now the New York Telephone Co., as electrician, soon becoming its chief engineer. In 1907, he became chief engineer of the American Telephone & Telegraph Co., and in 1919 was appointed a vice-president.

Carl A. Kraege, for the past ten months manager of the La Porte County Indiana Telephone Co., La Porte, Ind., has been transferred to Elkhart, Ind., as commercial and traffic superintendent for the Indiana properties of the Associated Telephone Utilities Co., Madison, Wis. Prior to his association with the La Porte County company, Mr. Kraege was with the Associated company in the capacity of field man.

He was educated at Annapolis as an officer for the United States Navy, and is a graduate engineer of the University of Wisconsin. He has had considerable experience in telephone directory work, having served as manager of the Des Moines office of the American Telephone Advertising Co., of Kansas City, Mo.

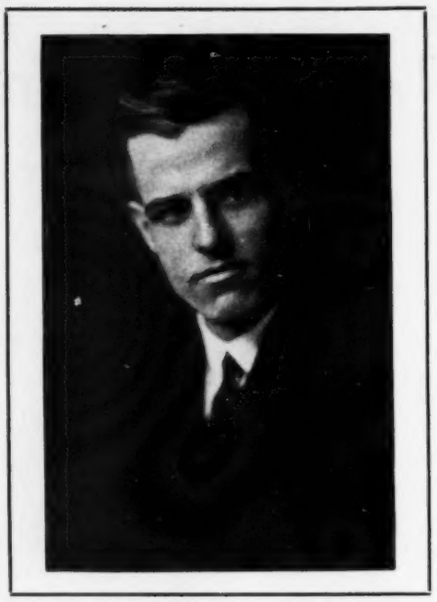
Mr. Kraege worked in the offices of the Kansas Telephone Association at Topeka, Kans., for some time, where he secured first-hand information on public relations work, rate cases before the public service commission, and on general telephone business. Prior to his connection with the Associated Telephone Utilities Co. at Madison, Wis., in 1929, he was general manager of the Kansas Telephone Co. at Topeka, Kans.

Frank J. Baker, assistant general plant superintendent of the Home Telephone & Telegraph Co., Fort Wayne, Ind., has been promoted to the position of general plant superintendent. The promotion was effective October 1.

Mr. Baker has been in the employ of the company 20 years in various positions. In 1926 he was made operating engineer, with supervision over all maintenance forces. In 1929 he was made assistant general plant superintendent.

He was the first president of the Home Telephone Athletic Association, organized in 1926. He held this office for two years and has since held several important positions in the organization.

In this new position, Mr. Baker will have complete supervision over maintenance and general plant work. He will continue to report to Harry E. Gray, chief engineer.



Frank J. Baker, Who Has Been Connected with the Home Telephone & Telegraph Co., Fort Wayne, Ind., for 20 Years, Has Been Promoted to the Position of General Plant Superintendent.

Obituary.

Frank Allison Davis, a well-known attorney and capitalist of Columbus, Ohio, and the chief organizer of the former Columbus Citizens Telephone Co., died at his home there recently, at the age of 72 years. He suffered a heart attack and passed away rather suddenly. Mr. Davis was born in Sag Harbor, Long Island, N. Y., and went to Columbus 48 years ago.

Frederick Perry Fish, noted corporation and patent lawyer, who was president of the American Telephone & Telegraph Co. from 1901 to 1907, died on November 6 at his home in Brookline, Mass. He was 75 years old.

Mr. Fish had a breakdown about 2½ years ago and had been in poor health much of the time since then. He is survived by a daughter, Miss Margaret A. Fish, and a son, Erland F. Fish, a member of his father's law firm. He married Miss Clara P. Livermore of Cambridge on April 7, 1880. She died several years ago. Two brothers, Nathaniel J. W. Fish of Taunton and Charles H. of Boston, also survive.

Mr. Fish was born in Taunton, Mass., on January 13, 1855, a son of Frederick L. and Mary Jarvis (Perry) Fish. He received his A. B. degree from Harvard in 1875 and was graduated from the Harvard law school in 1876.

He practiced both in New York and Boston until July 1, 1901, when he was elected president of the American Bell Telephone Co. and the American Telephone & Telegraph Co. In 1907, on giving up this position, he became a member of the legal firm of Fish, Richardson, Herrick & Neave.

During his long and busy life Mr. Fish occupied many positions with large corporations and with educational institutions. He had been a director of the New England and Old Colony Trust companies, a member of the board of overseers of Harvard, a member of the corporation and executive committee of the Massachusetts Institute of Technology and a member of the council of Radcliffe College.

Two organizations to which he gave a great deal of his time were the State Board of Education and the National Industrial Conference Board.

Attorney William Dean Bangs, 45 years old, general counsel for the Illinois Bell Telephone Co., died on November 9 at his Geneva, Ill., home of heart disease, believed to have been superinduced by nervous indigestion.

Mr. Bangs had been a member of the law firm of Cutting, Moore & Sidley in Chicago since 1918. He had been associated with the telephone company since 1922. Although born in St. Louis, he had lived in Chicago practically all his life. He graduated from Princeton in 1907, and from Harvard law school in 1910. He was admitted to the Illinois bar in that year.

Surviving him are the widow, Mrs. Lee Zimmerman Bangs; two sons, William Dean Jr. and Robert, and two daughters, Sara and Katherine. Mr. Bangs was a descendant of Edward Bangs, who came to America in 1623 on the schooner Ann, the third ship to arrive after the Mayflower.

Wilton L. Richards, who was a worker in the shop where the first telephone instrument was developed under the direction of Thomas A. Watson and had been with the Bell system for 52 years, died of influenza on November 7 at his home in Brooklyn, N. Y., at the age of 71.

Mr. Richards was born in Somerville, Mass. Soon after his graduation from the Comer Commercial College, Boston, he became associated with Thomas A. Watson in reserach work and experiments on the telephone invented by Alexander Graham Bell a year or two before.

In the beginning, his work consisted in the development and perfecting of all manner of telephone transmitters, including desk telephones, operator desks for exchanges and an early type of theater transmission, which was the forerunner of the present-day microphone. Some of the telephone leaders with whom he was associated included Francis Blake, Emile Berliner, Lyons and White.

A few years ago Mr. Richards undertook the work of collecting all the historical apparatus of the telephone company. In recent years he had acted as custodian-historian of the Bell system.

He was a member of the Microscopical Club, the Engineers Club and the Anglers Club, all of New York, and the Geographical Society.

Victoria, B. C., Welcomes Dial Service

Capital City of British Columbia, Can., Converts Entire Local Telephone Area to Strowger Operation—Largest Single Conversion Project in Canada to Date—Details of Automatic Installation and Cutover Ceremony, November 1

By H. E. Clapham

Although British Columbia, Can., is by no means a complete stranger to the Strowger dial telephone system, its first formal introduction to Strowger service on a large scale took place on Saturday night, November 1, with the conversion of the entire local telephone area of the city of Victoria, the largest city on Vancouver Island, and the seat of government for the province of British Columbia.

Victoria has long been the object of admiration of visitors to western Canada, for its growing industrial and commercial importance, combined with its superb natural setting, has made the city a gathering place for all who would enjoy the unique charm of an old world city together with the up-to-dateness of a thriving modern commercial center.

To say merely that the new dial telephone system "fits in" well with Victoria's other advantages is to "damn it with faint praise." The whole-hearted and spontaneous acceptance of the Strowger dial by Victoria telephone users indicates that the service was one of the few things needed to complete the advantages of an otherwise perfectly equipped city.

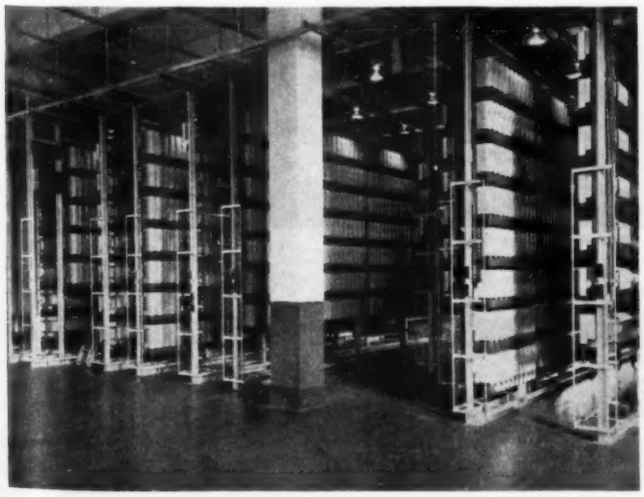
The British Columbia Telephone Co., which, with its connecting companies, operates approximately 125,000 telephones in some 70 exchanges throughout the province, has long been sensible of the advantages of dial operation, and has already converted some of its smaller exchanges. In recent years, it became increasingly apparent to the management that definite action would have to be taken if the Victoria exchange were to continue to render the high grade of service to which the telephone-users had become accustomed.

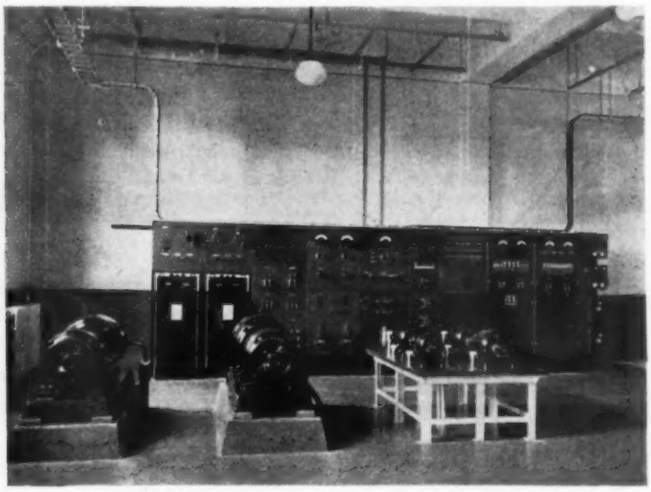
Telephone Exchange Building, Victoria, B. C., Can. Single-Story Addition to House Automatic Equipment Is Seen at Rear.

The existing manual switchboard being filled almost to capacity, the telephone company was faced with the necessity of choosing one of three plans: It could install another manual unit, which would mean the employment of two operators for each local call, with consequent slowing up of service; it could install a Strowger dial unit to work in conjunction with the existing manual board, a comparatively complicated arrangement involving considerable expense and effecting only moderate service improvement; or it could place the entire system on a dial basis.

The latter was obviously, from the standpoint of service, the most desirable choice; and after careful traffic surveys and preliminary engineering studies were made, orders for the entire installation were placed through the Independent Sales & Engineering Co., Ltd., of Vancouver.

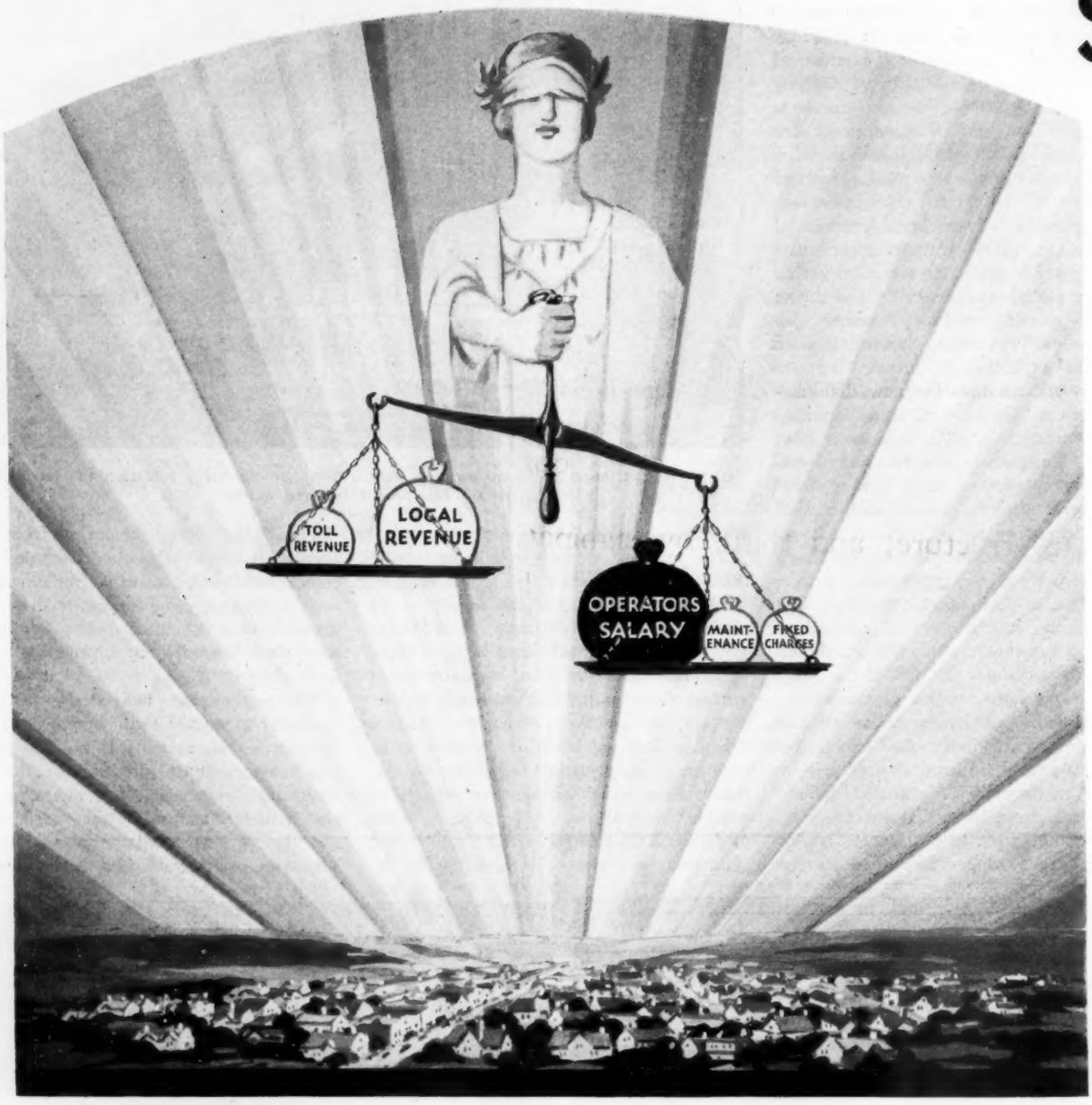
The engineering and design of the Strowger automatic switchboard were carried out by the staff of this organization, which also manufactured all of the elements of framework for mounting the switch shelves as well as the power board and the various auxiliary manual desks. The same company also handled the entire





View of Selectors Showing High Frame Mounting—Power Apparatus for Victoria Exchange, Showing Duplicate Charging Machines, Duplicate Ringing Machines, Rectifier Panels, and Power and Fuse Panels.

IS THIS ITEM COSTING U SMALL



STROWGER AUTOMATIC DIAL SYSTEMS

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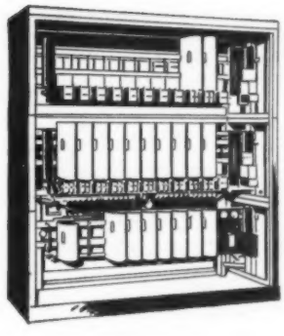
,L EXCHANGE PROFITS?

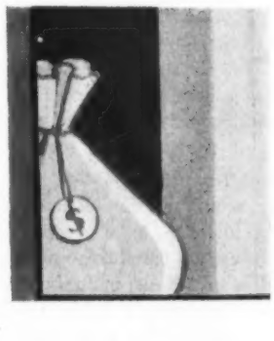
RATING labor in most small exchanges forms the largest ngle item of expense. In communities where the small number hones limits the income, yet twenty-four hour service is ded, the cost of constant day and night attendance is often t that profitable operation is impossible.

er Dial equipment for small exchanges has been meeting this need for years. These units have proved to be amazingly ful, for several reasons. First, they provide small communih instant, accurate service twenty-four hours of the day; the improved service they render provides a better basis for quate rate structure; and third, by eliminating the wages y paid local operators, they permit operation of small exs on a profitable basis. These sound and practical considerform the underlying reasons for the increasing adoption of er Dial operation for small exchanges, and merit the serious ration of every telephone executive.

ewly-developed sectional-type dial equipment for small ges now provides even greater flexibility and adaptability. ime-tried and proven Strowger switches combined with autoly-controlled power apparatus, this equipment is available in t, efficient combinations of "shelves" of standard design— of quick, easy expansion, and designed for operation on an unattended basis. Specific information concerning these s applied to particular networks gladly furnished by Automatic Inc., Chicago, U. S. A.



A Type 51 Strowger Dial Unit Equipped For 50 Lines and Two Toll Trunks.



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Gordon Farrell, President of the British Columbia Telephone Co., Expressed Keen Pleasure at the Success of the New Telephone System in Victoria.

work of installation. The Strowger switches and switch shelves were made by the Automatic Telephone Mfg. Co., Ltd., Liverpool, England, and shipped as shelf units to Victoria via the Panama Canal.

Long before the date set for the cutover—November 1—the installation of the Strowger switchboard was completed, and every element of equipment tested and retested. Ample time was allowed for the careful checking of all service features to make certain that everything would take place as planned.

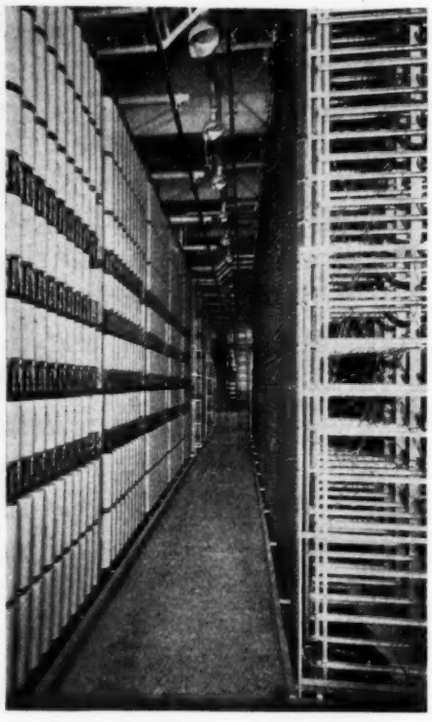
On the Saturday morning preceding the cutover, telephone people began to gather in Victoria from all parts of the province. To avoid hampering the men engaged in cut-over duties, the number of people admitted to the exchange was strictly limited, admission cards being issued by the officials of the telephone company.

The technical process of the cutover were relatively simple, the new equipment being installed in a new structure adjoining the old telephone office. The cables leading to the old main frame were tapped in the company's cable vault and new cables run to the new main frame. The automatic switchboard equipment was kept temporarily disconnected from the telephone lines at the jacks of the line relay groups, each relay group being lifted sufficiently to disconnect the jack contacts.

As the midnight hour approached, telephone officials and visitors gathered in the new switchroom. James Hamilton, vice-president and general manager of the British Columbia Telephone Co., opened the ceremonies by delivering a brief address in which he extended thanks to visiting government officials and press representatives for their cooperation in making the new system a success. He also complimented the local staff and the officials of the Independent Sales & Engineering Co., Ltd., for their work in connection with the installation and cutover preparations.

In reviewing telephone progress in British Columbia, Mr. Hamilton pointed out that it had always been the policy of the company to take advantage of the very finest developments that telephone science had to offer, and that the selection of the Strowger dial system was in full accord with that policy. Mr. Hamilton then introduced Mayor Herbert Anscomb, of Victoria, who responded briefly and to whom was accorded the honor of making the first of a number of ceremonial calls after the cut-over.

At 11:55 p. m. a group of men was stationed at the old main frame, and at a given signal pulled the heat coils, disconnecting the lines from the manual board. As soon as this was completed, the signal was transmitted to the new switchroom for the line relay groups to be dropped in place. In less than three minutes, the entire job was completed. Almost immediately traffic began to flow through the new board, many people apparently having waited up to try out the new system. Visitors were then invited to partake of a buffet supper which had been prepared in the automatic switchroom.



An Idea of the Size of the Victoria Switchroom May Be Had from This View, Showing the Aisle Between the Line I. D. F. and the Line-Finder Racks.

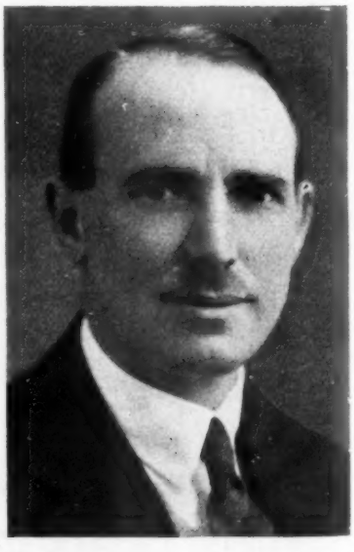
On the Sunday and Monday following the cutover, the telephone traffic was considerably above normal, but the new equipment functioned with the utmost smoothness. In fact, some of the more mature automatic engineers present agreed that it was one of the "cleanest" cutovers in their experience.

Much of the credit for the success of the project belongs to the Victoria commercial staff, headed by J. C. Peterson, and the traffic department headed by N. G. Fitchpatrick, traffic superintendent, and especially to the members of co-ordination committee, who were drawn from the various departments involved.

Besides those already mentioned, visitors and officials present at the cutover included Gordon Farrell, president of the British Columbia Telephone Co.; E. F. Helliwell, commercial superintendent; Ralph Argue, Andrew Jack and Miss E. R. Walker of the traffic department; E. P. La Belle and N. J. Dunlop of the plant department; A. H. Lemmon, chief engineer; Sterling Ross, equipment engineer, and C. H. McLean, transmission engineer.

The Independent Sales & Engineering Co. was represented by G. B. Rickards, vice-president and general manager; Roy Bowland, general sales engineer; George Knowles, sales engineer, and G. K. Haspel, automatic engineer. The work of installation, for which the same company was responsible, was handled by V. L. Bunkleman, who also directed the cutover procedure.

Because of the desirability of providing for the ample expansion which is expected to materialize in Victoria in the next few years, no attempt was made to install the automatic equipment in the old building. Instead, a new, one-story structure, especially designed to accommodate the high frames on which the Victoria switching equipment is mounted, was erected side by side with the old building, the main floor being occupied by the Strowger apparatus.



James Hamilton, Vice-President and General Manager, Paid Tribute to Victoria Newspapers for Their Support and to Telephone Employes for Work in Bringing the Cutover to a Successful Conclusion.

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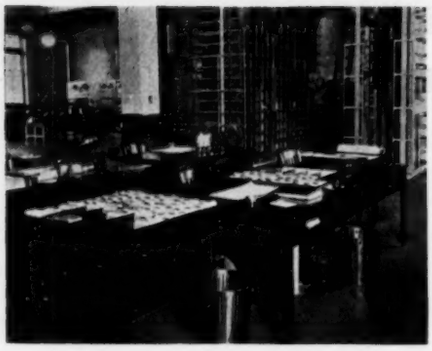


Special Service Desks at Victoria, B. C.

That ample space has been allowed for growth is indicated by the fact that while the initial installation takes care of approximately 17,500 station terminals, the present switchroom floor space is extensive enough to take care of approximately 40,000 terminals.

In addition, the structure is so designed that other floors may be added whenever occasion requires.

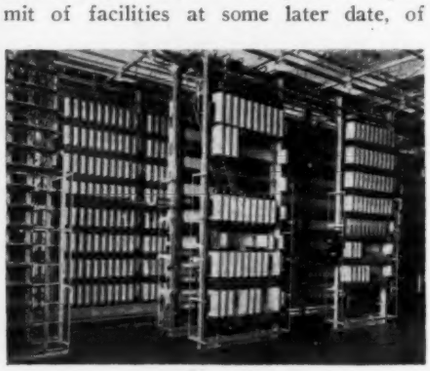
The automatic switchboard apparatus, while of standard Strowger design throughout, possesses several features of interest to the telephone technician. The subscribers' line equipment consists of 200-point Strowger line finders and line-and-cut-off relays mounted on standard four-foot shelves, with four shelves each of line finders and relay groups to the "bay." The switch bays are placed end to end in rows to form suits, which extend to a height of approximately 11 ft. 6 ins. above the floor. The selectors, connectors and special service switches are also mounted on four-foot shelves, the shelves being similarly arranged in bays and suites.

Each bay is equipped with a panel on which are mounted supervisory signals and fuses, and traffic meter terminal blocks which are so arranged that traffic overflow may be recorded by individual shelves or by groups by the simple expedient of changing small U links on the terminal blocks.

The numbering plan for the Victoria area involves the use of an office name and a four-digit number. While only the first letter of the name is dialed, the standard 24-letter metropolitan dial is used, and the choice of office names ("Empire" and "Garden") is based on the use of the third and fourth levels of the first selectors. The special service numbering plan is also in accordance with standard practices in North America, as follows:

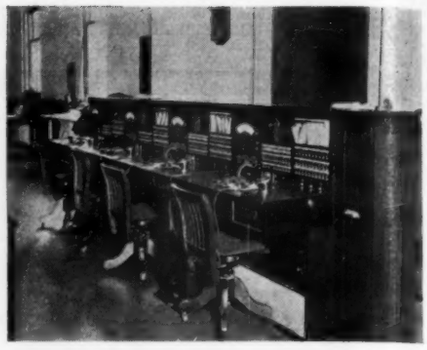
Service and suburban	0
Long distance	110
Reverting calls	119
Wire chief	117
Repair clerk	114
Information	113

The second level of the first selectors has been left vacant for the present to permit of facilities at some later date, of



Close-up View of Special Switch Racks and Selector Bays.

through dialing to those suburban exchanges—Belmont, Colquitz and Gordon Head—now operating on a magneto basis. At the present time traffic to and from these exchanges, which are all of less than 100-line capacity, is handled manually through the dial service "A" board. However, the switching equipment in Victoria is so arranged that, by making minor wiring changes, service between these exchanges and Victoria proper may be offered on a restricted or unrestricted automatic basis, or a combination of the two, as subsequent commercial developments may dictate.



Test Desks in New Exchange at Victoria, British Columbia.

The largest proportion of the Victoria local service is on a flat-rate basis, approximately 10 per cent of the stations being on a measured-service basis. Almost one-half of the stations are arranged for two-party working. These are full selective, ringing to ground from either side of the line, while there are a few four-party lines on a semi-selective (one and two-ring) basis. Full-line intermediate distributing frame facilities are provided so that any of the 11,000 line-finder terminals may be cross-connected to any connector terminal in the exchange.

The power equipment, which, except for the batteries, is installed in the automatic switchroom, consists of two 300-ampere motor generators, two 50-ampere rectifiers, and duplicate ringing machines. The power board was manufactured in the shops of the Independent Sales & Engineering Co., Ltd., Vancouver. An interesting feature of the power equipment is the use of bus-bar distribution to the Strowger switchboard in place of power cables, the bus-bar being suspended (*Continued on page* 35.)

Some of Staff of British Columbia Telephone Co. in Front of Victoria Telephone Building. In Front Center Are James Hamilton, Vice-President and General Manager, and E. F. Helliwell, Commercial Superintendent—General View of the Victoria Battery Room.

(*Concluded from page* 30.)

from the ceiling and separated from the frame by porcelain insulators.

The dial service "A" board installed in the old operating room is being used at present for handling traffic to the suburban exchanges, for intercepting service and for subscriber assistance. Besides this, there is a four-position information desk installed in the same room and a four-position test desk and a two-position repair desk in the switchroom. All of this manual equipment, with the exception of the test desk, was built in the sales company's plant in Vancouver. The same toll board is being used as before, the necessary modifications being made for adaptation to the Strowger automatic toll switch train.

The success and smooth-running progress of the Victoria installation in the few days it has been in service, and the enthusiasm of both the telephone company officials and the telephone-users, augur well for the future of the Strowger dial system in the province of British Columbia.

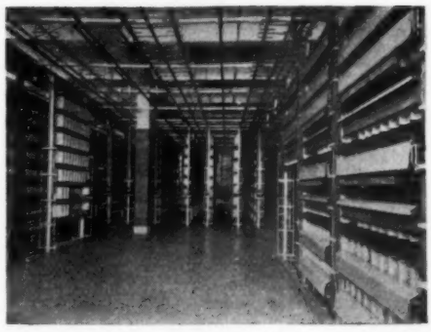
It is noteworthy that the Strowger system is the only dial telephone system used in Canada, east as well as west. With the introduction of that system in the second largest city of British Columbia, an excellent start has been made on a development program which should eventually place that province in the van of world telephone progress.

November Telephone Meetings of Oklahoma Utilities Association.

Oklahoma telephone men have completed preparations for the November series of district telephone meetings of the Oklahoma Utilities Association. These meetings will be held as follows:

At Yale, November 17, under auspices of the Oklahoma Associated Telephone Co.; at Purcell, November 19, sponsored by the Southwest Telephone Co., and Purcell Chamber of Commerce and Rotary Club; and at Temple, November 21, sponsored by the Southwest Telephone Co. and local chamber of commerce.

These meetings not only give telephone people an unusual opportunity to meet their associates in the industry and exchange valuable ideas, but also to come in contact with the public, as local citizens have a prominent part in each of the meetings.



General View of Victorian Switchroom Looking Towards Selector Racks.

A. T. & T. Co. Secures Sites for Transpacific Radio Stations.

Sites for radio stations for telephone service across the Pacific Ocean have been purchased by the Transpacific Communication Co., Ltd., a subsidiary of the American Telephone & Telegraph Co. Erection of the stations will begin early next year and service between the United States and Hawaii is scheduled to begin during January, 1932.

This is the first step in the move of the Bell system to connect its United States network with far Eastern countries in or bordering on the Pacific. The project contemplates eventual establishment of services to Japan, Australia, the Philippines and Alaska, as well as ships at sea.

The transmitting station will be located at Dixon, Calif., near Sacramento. The 20 kilowatt transmitter to be installed there, which will be similar to those used in the transatlantic telephone service, will operate on wave lengths between 14 and 44 meters. The antennas will have marked directional characteristics. Other transmitters will be installed as new channels are opened.

The receiving station will be located at Point Reyes, Calif., on the coast northwest of San Francisco. Its antennas will also have directional characteristics. The equipment for both stations is now being built by the Western Electric Co. and the Bell Telephone Laboratories, Inc.

The radio channels set up by these stations initially will connect with the telephone system of the Mutual Telephone Co. at Hawaii. This consists of wire networks on several of the islands to be linked to one another by a low-power short-wave radio telephone system that is being extended to cover practically the entire archipelago.

What the Commissions Are Doing

Up-to-the-Minute News Regarding the Activities of State and Interstate Commissions, Courts and City Councils in Matters Concerning Telephone Companies—Summary of Commission Orders and Schedule of Telephone Hearings

Upholds Charge Based on Airline Instead of Route Measurement.

A charge of $5 per mile air-line measurement instead of $4 per mile route measurement for "tie lines" or leased circuits of the Bell Telephone Co. of Pa. was held to be justified in a recent order of the Pennsylvania Public Service Commission.

The change of rate had been attacked in a complaint filed by the Armstrong Cork Co., which alleged that the new rate was unjust and unreasonable and resulted in undue preference and prejudice to the complainant.

"The former rate based on route measurement," the commission's order said, "required anyone contracting for this type of service to pay $4 per mile for the actual route followed, with the understanding that the telephone company would use the shortest route over which spare facilities were available. In other words, two companies subscribing to the same service between the same points may have been paying different charges, due to the routing of the facilities necessary to furnish the service. For example, six different routes are available between Harrisburg and Lancaster, no two being the same distance.

"The complainant contends that air-line mileage is only theoretical mileage and that messages will continue actually to travel via a route mileage, and the change results in unjust and discriminatory charges.

On the other hand, the telephone company states that air-line measurement is uniformly applied to toll messages handled by the company and found to be the most equitable arrangement for all of their patrons. Due to the increasing number of patrons applying for tie-line service, it was found necessary to make this change in order to offer all subscribers the same service at the same rate.

No testimony has been offered to show that the total gross revenue derived from this type of service was in excess of a reasonable return. It is obvious that had all the rates under the route measurement set-up been based on the shortest possible route of the company's facilities in service, irrespective of what route actually was followed to furnish this service, the charge would have been more than $4 per mile, if the same gross revenue were to be produced.

The record further shows that the respondent has 161 contracts for this class of service and that in 71 instances the air-line method of measurement has resulted in increases; in 83 instances the air-line method of measurement has resulted in decreases and in seven instances there is no change whatsoever. It is also stated that the purpose of respondent was not to increase its rates, but to maintain the same

amount of gross revenue from this class of service.

The method employed in arriving at the $5 rate per mile for air-line measurement was to divide the gross revenue received under the route measurement system heretofore in effect by the total air-line miles of all the contracts, and the result produced approximately $5 per mile. The respondent further states that the application of the new rate will result in lowering the gross revenue in an amount between $5,000 and $10,000 annually.

From all the facts of record, the commission concludes and finds that the rate complained of for tie lines or leased circuits based on air-line measurement has not been shown to be unjust or unreasonable, unjustly discriminatory or unduly preferential.

An order will issue dismissing the complaint."

Interolcutory Injunction D e n i e d Southern Indiana T. & T. Co.

The plea of the Southern Indiana Telephone & Telegraph Co., of Seymour, Ind., for an interlocutory injunction to prevent the Indiana Public Service Commission from interfering with a proposed increase in rates, was denied by a three-judge federal court in Indianapolis on November 8.

The petition for a permanent injunction will be referred immediately to Samuel Dowden, special master in chancery.

The judges sitting in the case who heard the final arguments on the petition for temporary relief were Judge Will M. Sparks of the United States Circuit Court of Appeals at Chicago, Judge Robert C. Baltzell of the Southern Indiana division of federal court and Judge Thomas W. Slick of the Northern Indiana division of federal court.

The raise in rates would have increased the revenue of the company approximately $4,800 each month and would have provided for a return of 3.42 per cent on the valuation of the company's property at $1,890,000, attorneys for the utilities asserted.

The public service commission asserted that officers had repeatedly ignored warnings concerning alleged extravagances in operating expenses and declared the drought-stricken citizens of the communities served by the utility would not stand an increase in rates.

"We feel that the court can not and ought not grant the injunction at this time," said Judge Sparks in making the ruling. "Because of charges of alleged extravagances in operating, we feel the case will require some time and it is better that a special master handle it."

Chicago Mayor Vetoes Illinois Bell Telephone Co. Franchise.

In a message to the Chicago city council on November 5, Mayor W. H. Thompson vetoed the proposed franchise grant to the Illinois Bell Telephone Co. which the aldermen passed at their last regular session on July 29 by a vote of 37 to 9. Three reasons were given by Mayor Thompson for withholding approval of the ordinance.

Action on the veto message was deferred by the council until November 24 at the request of Alderman Jacob M. Arvey, chairman of the gas-oil committee, which was charged with preparation of the franchise. In requesting the council to recess until that date, Alderman Arvey indicated his intention of attempting to override the mayor's veto.

An effort to repass the ordinance over the veto might have been made on November 5, according to supporters of the franchise, had not Mayor Thompson been absent from the meeting due to a recent operation.

In explanation of his action in withholding approval of the ordinance, Mayor Thompson said:

"1. I can see little or no benefit to the the telephone subscribers in this proposed ordinance.

"2. That under this proposed ordinance the people of the city of Chicago will lose in compensation to the city the sum of more than $500,000 a year. Under the 1907 telephone ordinance the city hall was given free telephone service, and various other city offices outside of the city hall were given service at 25 per cent discount.

"Under the proposed ordinance the city of Chicago is called upon to pay for its telephone service and allowed a discount of 50 per cent up to December 31, 1935; from January 1, 1936, to December 31, 1945, a discount of 25 per cent. For the balance of the term of the ordinance, there is to be no discount, but the city is required to pay full rates for its telephone service."

Furthermore, the mayor pointed out that in the 1907 ordinance there was an agreement between the telephone company and the city whereby the company agreed to remove and relocate its wires, poles, conduits, etc., at its own expense. He found no such provision in the new ordinance. He said this omission might interfere with the subway and cost the taxpayers of the city millions of dollars.

The mayor when he went to Nantucket, Mass., for his summer vacation, took the ordinance with him for study. It is believed he reached the decision not to approve it before his return to Chicago.

Michigan Commission Starts Investigation of Bell Rates.

An order which may result in a statewide revision of rates charged by the Michigan Bell Telephone Co., "because of present economic conditions" was issued on November 1 by the Michigan Public Utilities Commission. The company is ordered to make appearance before the commission in Lansing on November 18 to show cause why its entire rate structure should not be revised.

The order is the latest chapter in a controversy which has existed between the state and the Michigan Bell company for several years, and there is now pending in U. S. district court at Detroit an appeal by the company from a rate structure approved by the commission about three years ago.

"The commission is of the opinion that the whole subject of rates, rental, tolls and charges, and the reasonableness thereof, should be the subject of an investigation by the commission," the order reads.

In so doing, according to the order, the commission is "taking judicial notice of present economic conditions which have or may have a bearing upon the property and facilities of the company and upon its operating expenses.

"Complaint has been filed with the commission by the attorney general to the effect that rates fixed in previous orders are probably higher than is just and reasonable and than the economic conditions relating to the telephone business of the company would justify."

The Michigan Municipal League has been one of the outstanding factions in the fight to secure lower rates in the case which is now pending in Detroit. In the Detroit litigation the company has temporarily blocked the state's drive for lower rates and in a previous suit the company won substantiation of its contract with the A. T. & T. Co.

Nebraska Counties Turn Down County Telephone Systems.

Voters in Clay county, Nebraska, at the recent election, emphatically turned down a proposal to authorize the county board to vote bonds for the construction of a county telephone system, and to maintain and operate one. The vote was 550 for to 4,628 against.

In Saunders county where John O. Schmidt, a farmer circulated a petition to submit county ownership, he succeeded in getting but 470 signatures. The law requires that such a petition to the county board have the signatures of 10 per cent of the total number voting at the last preceding election, which was 9,000. Mr. Schmidt tried to get the board to use the primary election vote as a basis, but the county attorney advised that this was not the law.

Mr. Schmidt is a socialistically-inclined farmer who had led several other forlorn hopes, and was recently defeated as a primary candidate for congress. He sought in this instance to capitalize the recently-ordered increase in rates at the Wahoo exchange.

The fight in Clay county for county ownership was led by J. M. Paul, an attorney of Harvard, who was recently denied the right to appear before the state railway commission because he refused to retract or apologize for a statement made in a public meeting to the effect that the social relations between members of the commis-

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sion and the officers of the Lincoln Telephone & Telegraph Co. were such that the people were placed at a disadvantage in controversies with the company before the commission, and intimated that that body had prejudged the rate case.

Attorney Paul claimed that county ownership was the only way to secure competition as the railway commission would not permit local capital to construct and operate one, a mis-statement of the law for which he was called down by Judge John S. Logan, who led the opposition. The telephone company, which operates a number of exchanges in the county, took no part in the election.

Mr. Paul argued that if the county went into the business, telephone rates would drop 50 per cent within 30 days, but he was unable to make any headway, even in his own community, which voted 42 for and 372 against. In the city of Edgar, where the company encountered some local prejudice because of a recent raise in rates following the substitution of metallic for magneto grounded service, the affirmative vote was but 25, while the negative was 404.

This is the fifth time that the county ownership law has been made use of at an election. Some years ago a petition for an election was circulated in Clay county, but not enough signatures were secured. This year the socialists took advantage of the situation resulting from several rate readjustments, but were barely able to poll a tenth of the vote in favor of it.

At previous elections the counties of Howard, York, Stanton and Antelope had voted down public ownership proposals by votes running from two to one to five to one, but in the Clay county poll it was an almost nine-to-one defeat.

Nebraska Commission Taking Notice of Misrepresentations of It.

Railway Commissioner Drake has ruled, in a matter brought to his attention by John S. Logan of Fairfield, Neb., that the Nebraska commission is without power to veto or approve the organization of new telephone companies.

Fairfield is in Clay county, where J. M. Paul, an attorney who was recently denied the right to appear before the commission in a rate hearing because of scurrilous remarks he had made at a public meeting in which the motives of commissioners was impugned, has been unsuccessfully attempting to secure the submission of a proposal that the county engage in the telephone business and give service within its borders.

Mr. Logan said that Attorney Paul was asked why, if there is so much profit in operating a telephone company, he did not himself engage in the business. He is quoted as replying that the railway commission had refused and would continue to disapprove the entrance in the business of local and independent companies in oppopsition to the big companies.

"The statement is entirely without foundation," says Mr. Drake. "It is strictly within the sole jurisdiction of any local municipality to grant or refuse the right of franchises, including the use of streets and alleys, to any telephone company. The commission has nothing to say about it; and any statement made to the contrary by anybody in Nebraska concerning either the law or the policy of the commission is false, made either in ignorance or maliciously.

"If and when a telephone company is organized and doing business in Nebraska and selling service to citizens, the jurisdiction over the rates and service of such telephone company does come within the jurisdiction of the commission, with the exception of purely cooperative companies which do not serve any person other than members of the cooperative association.

There is one additional case in which this commission exercises no jurisdiction whatever; that is if and when any county should establish a county telephone system, wherein the county board becomes responsible for the organization, regulation, maintenance and extension of such county-owner telephone system, the rates and service of such a telephone company would not come within our jurisdiction.

The commission at present assumes the responsibility specifically given to it by the statutes, in regard to rates, service and security issues; and I believe it is its duty to decide all questions presented, according to such laws and the court decisions interpreting the same. In all rate cases, the commission sits as a court in equity, with the same jurisdiction as a district court. Appeals are made directly from the commission to the state supreme court, and the records show that only one appeal has been taken in five years, which should be indicative of the fairness of its decisions."

Members of the commission have adopted the policy of taking prompt notice of persons who wilfully misrepresent it. It has been a common practice in the past to blame the commission for rate increases; but the limit was passed recently when farmers complained that right-of-way agents who were seeking to get an easement for a natural gas pipe-line company told the farmers that the commission had fixed the price per rod, and got away with it in a number of instances. The commission cited the gas company officials and held a hearing.

Findings have just been entered to the effect that the misrepresentation complained of had been frequently made, but the commission exonerates the gas company officials from any responsibility. Owing to the circumstances and the fact that the agents who did the lying have been discharged by the company and gone elsewhere, the commission says that it has concluded not to seek to bring them into court on contempt charges.

The commission expresses its regret that the courts do not give it the power to cite and to punish for contemptuous acts, since it subjects the members of it to a species of misrepresentation that, unchecked, is bound to undermine the confidence of the people in the fairness and honesty of the members.

As the people have adopted the policy of regulation and defined by laws and through court decisions how that regulation shall be administered, the commissioners feel that they should not be compelled to sit silent while charges and rumors affecting its integrity are freely circulated in communities.

Tax Ruling Regards Making Program Service Connections.

Moneys received by a telephone company in Minnesota for installing connections to radio receivers are not subject to the gross receipts tax, Assistant Attorney General W. K. Montague, of Minnesota, has ruled.

The work is done for a program service company, and in order to transmit the programs it is necessary that the subscriber's radio receiver be connected with the telephone cables by a connection separate from his telephone connection, it was explained.

The opinion, which was delivered to the public examiner, follows in full text:

"In an opinion dated April 7, 1930, to you, this office held that moneys received by the Tri State Telephone & Telegraph Co. from the Program Service Co. for installing radio receivers for the reception of radio programs by subscribers of the Program Service Co. should be included in calculating the tax of the telephone company under our gross earnings tax law.

Since that opinion was rendered, we have received some additional information as to the nature of this work and have, at the request of the telephone company, re-examined the subject. As a result of this re-examination, we have reached the conclusion that our original opinion was in error and that the receipts from this service are not properly included in calculating the tax in question.

The Program Service Co. uses the wires of the Tri State Telephone & Telegraph Co. for the transmission of radio programs to its subscribers for which privilege it pays the Tri State Telephone & Telegraph Co. a flat rate of 39 cents per month per subscriber. This amount is included in calculating the gross earnings tax of the telephone company.

In order to transmit the programs, it is necessary that the subscriber's radio receiver be connected with the telephone cables by a connection separate from his telephone connection. A new wire must be run from the telephone cable to the point in the subscriber's home where the receiver is located. The Program Service Co. may, if it desires, make this connection itself. If the telephone company is requested to do so, it makes the connection and charges $12.40 for each installation.

(*Please turn to page* 42.)

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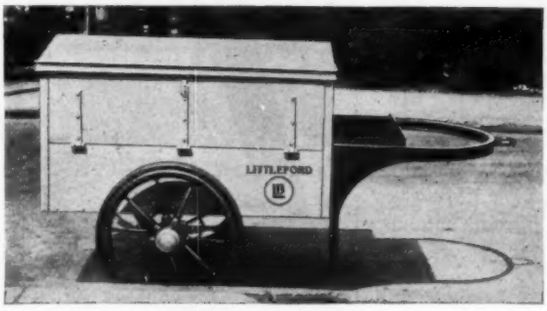

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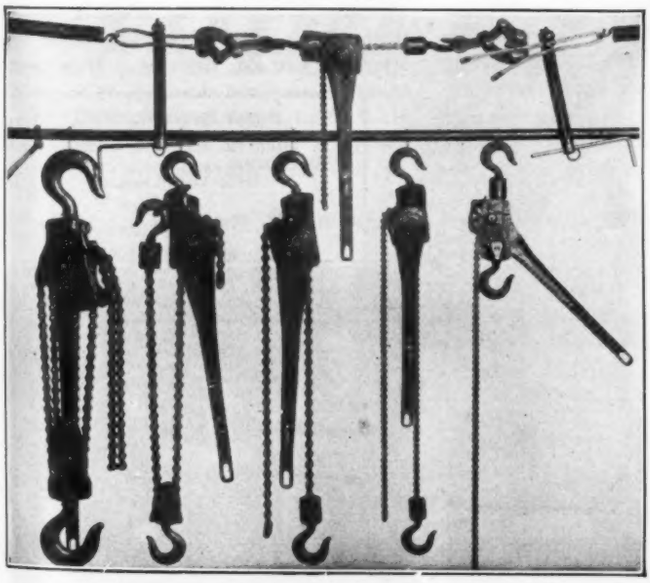

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½ Ton	3 Ton	1½ Ton	¾ Ton	Reversed
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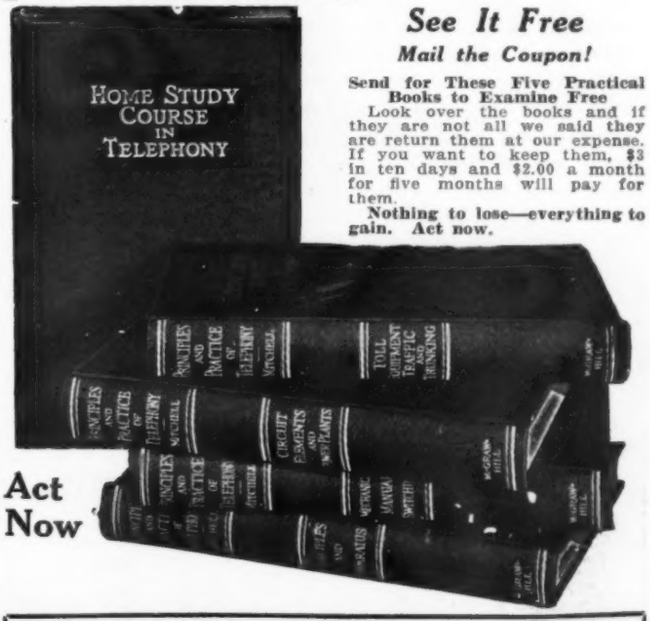

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With the Manufacturers and Jobbers

New Torch for Utility Companies and for General Use.

Otto Bernz Co., Inc., of Newark, N. J., has just perfected a new torch to be added to its famous line of "Always Reliable" torches and furnaces. This torch is fitted with an improved burner for which a patent has been applied. This burner is so constructed, it is said, that it will burn indefinitely with a blue hot flame before a thorough cleaning is necessary. It can quickly be cleaned.

The New No. 91 Bernz Blow Torch.

The looped hanging handle at the lower portion of the burner is attached to a spiral spring which runs through the burner pipe. When this looped handle is turned to the right, it turns the spiral spring in the burner pipe, thereby loosening the carbon. The carbon is then forced through the burner pipe and the burner orifice in the form of sparks. There is a cleaning needle attached to the blunt burner needle, which keeps the orifice open at all times.

Due to the construction of the blunt burner needle, the orifice cannot be enlarged by forcing the burner needle. The burner needle is fitted with the improved wire wheel which does not get as hot as do most wheels used on torches. The burner pipe can be replaced at a nominal cost when necessary. Both the burner needle and the spiral spring connection have the non-removable stuffing box nuts.

In addition to the improved burner just described, the No. 91 torch is fitted with the patented "Never Leak" pump, brass reservoir and brass bottom, bronze brackets holding the handle, and the removable cast bronze soldering iron hook.

The tank on the 91 torch is highly polished and lacquered. This torch is so designed that it will burn gasoline or kerosene by merely changing the burner block.

New Model Splice Tester for Locating "High Joints."

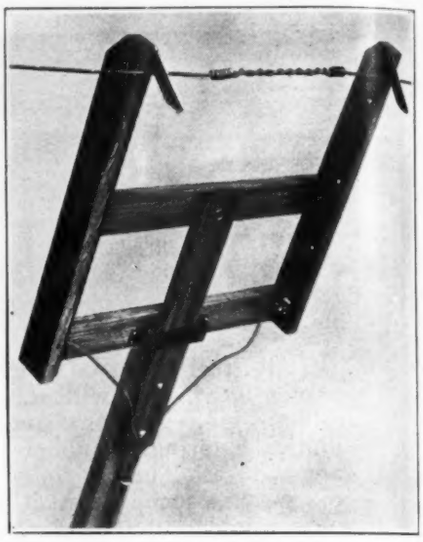
Like the chain that is no stronger than its weakest link, a telephone line is no better than its poorest joint.

Copper-to-iron connections, of course, should be soldered, and they are usually accessible for doing this. It long was a practice to make splices in iron wire without soldering. As the galvanizing disappears and corrosion sets in, these splices develop more or less resistance, and poor transmission is the result.

"High joints" form one of the most aggravating troubles the telephone man has to deal with, owing to the difficulty of locating them.

About three years ago W. L. McMillen, of Osborne, Kans., developed a "splice tester" that gave excellent results and it was placed on the market as the "Portis" splice tester. The design has been improved and a tester is now offered that is a big help in keeping lines free of the "high joint" bugaboo. The tester is used in connection with a suitable resistance meter which has been developed by the same manufacturer.

Full information will be furnished upon application to the manufacturer, W. L. McMillen, Osborne, Kans.



Tester for Locating "High Resistance Joints" in Rural Line Wires.

Death of Frank Baackes, American Steel & Wire Co.

Frank Baackes, 67, a vice-president of the American Steel & Wire Co., at Chicago, died at his home in that city October 18, after an illness of several months.

Mr. Baackes was born in St. Teonis, Germany, March 9, 1863, and was educated in the public schools there and in the high school at Crefeld, Germany. He removed to this country and started in 1879 with the H. P. Nail Co., Cleveland, Ohio. About five years later he went to Beaver Falls, Pa., to erect a wire plant for the Hartman Steel Co.

Late in 1895, Mr. Baackes organized the

The Stromberg-Carlson Booth at the National Telephone Convention Recently Held in Chicago. The Display Was Very Interesting and Included Products of Its Telephone and Radio Divisions—F. S. Coakley, Wire Chief of the Dixon Home Telephone Co. of Dixon, Ill., Was Awarded a No. 10 Stromberg-Carlson Radio Receiver. H. T. McCaig (at right), Assistant Chicago Manager, Presented It.

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This advertisement formally places at your command the experience and expert knowledge about storage batteries and their operation which Exide Engineers have acquired through more than 36 years of building batteries for every telephone use.

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Crapo Galvanized Products combine *every* element essential to long life and low maintenance cost: pure zinc coatings, *non-cracking, non-peeling*—correct tensile values—proper ductility.

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More power than you need.
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A SEAMLESS zinc cup with no soldered joint is free from electro-couple losses.

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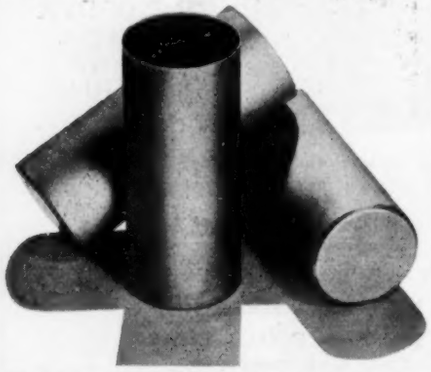
Storm King Duro Powr Batteries were designed especially for Telephone work—able to withstand long periods of inactivity and ready for instant service at the close of the circuit.

Insure subscriber satisfaction and reduce maintenance costs with Storm King Duro Powr Telephone Batteries. Install a hundred or more now and check results against any other battery.



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Salem Wire Nail Co., Salem, Ohio, remaining with it as superintendent and general manager until its absorption by the American Steel & Wire Co. of Illinois, in 1897, when he became the latter's general manager.

In 1899, when the American Steel & Wire Co. of New Jersey was organized, Mr. Baackes became general superintendent, and in June, 1900, was appointed general sales agent. Later he was elected vice-president and general sales agent.

Mr. Baackes is survived by his widow, Mrs. Mary E. Baackes, and two sons, Frank, Jr., and Karl. He was a member of the Chicago Athletic Association, South Shore Country Club and a life member of the Art Institute of Chicago.

Illinois Farmers Company Orders Leich Magneto Switchboard.

The Farmers Telephone Co. of Lee Co., Ashton, Ill., recently placed an order with the Leich Electric Co. for a new 100-line magneto switchboard to be installed at Lee Center, Ill. This company operates five exchanges, all of which have Leich switchboards.

It always takes great pride in giving the very best service possible to subscribers, and has spared no expense in keeping its plants and equipment in the very best condition.

The company's affairs have been ably looked after by the following officers: Geo. Schafer, president and general manager; C. W. Bowers, secretary and treasurer, and Ed. Berry, superintendent.

Four-Wheel Drive Auto Co. Pays Cash Dividend.

The regular semi-annual 3 per cent cash dividend due stockholders of the Four Wheel Drive Auto Co., Clintonville, Wis., as of October 1, has been paid in full to a total of $51,828. This is the 12th consecutive cash payment thus made.

WHAT THE COURTS AND COMMISSIONS ARE DOING.

(*Continued from page* 38.)

The work of making the connection includes running the wire from the telephone cable into the subscriber's residence and connecting the loud speaker therewith. This wire and all connections become the property of the Program Service Co. and not of the telephone company.

The telephone company claims that the work is performed by it at cost as nearly as that cost can be estimated; that the advantage to it in doing the work is that it gives its repair and installation men steady employment where otherwise they would be laid off because of seasonal decreases in telephone repair work.

There is no requirement that the subscriber to the service of the Program Service Co. must be a telephone subscriber, although that is the case in nearly all instances.

In writing our former opinion, we had assumed that the telephone company was obligated to do the work in question and that the Program Service Co. had no right to make the connection; that the telephone company owned the wires and all connections except the loud-speaker itself; that in all cases the subscribers to the radio service were telephone subscribers. In assuming these facts we were apparently in error.

In our opinion, this work, if done at cost in the manner and under the arrangement represented by the telephone company, is so disconnected from the telephone business that the receipts therefrom are not subject to taxation. We think it is analogous to work done by the railway companies at cost in installing private spur tracks for customers, receipts from which were held to be nontaxable in the cases of State v. M. & I. Ry. Co., 106 Minn. 176, and State v. Great Northern Ry. Co., 163 Minn. 88."

Asks Commission to Approve Gross and Net Standard Rates.

The Western Telephone Corp., which recently acquired a number of exchanges in northeastern Nebraska, has asked the Nebraska State Railway Commission for authority to publish gross and net standard rates. These call for the addition of 25 cents a month to the authorized rates where rentals are not paid on farm lines within the first three months of the year and upon city service by the tenth of each month.

The company recently added Bloomfield, celebrated in telephone history as the town where subscribers went on a strike against a 25-cent rate increase, and eventually forced the owners, the Union Telephone Co. of Wausa, to sell to local men. Other exchanges acquired by the Western corporation and now operated by it are located, at Wausa, Osmond, Lynch, Verdel, Monowi, Page, Ewing, Crofton, Verdigre, Callaway, Stapleton and Oconto.

It is at these places that it wishes the gross and net rule to apply. The last three exchanges are located in west central Nebraska, and all are operated from an office at Omaha which is in charge of J. R. Shipley.

Troubles of Subscribers with Exchange in Another State.

Kansas subscribers of the Chester, Neb., Telephone Co. have found themselves to be in a real No-Man's Land. They have been complaining to the company about the character of the service given, due to the poor construction, but have been unable to secure redress. They also complain that "Central" is negligent in answering calls.

They applied to the Kansas Public Utility Commission, and were told that no help could be given them because the company was located in Nebraska and, therefore, not under the authority of the Kansas com-

Suttle Loud Ringing Extension Bells

Two six-inch gongs mounted on wood panel with heavy clapper. Heavy duty ringer entirely enclosed. Finish black. Just the thing for garage, warehouse, barn, or other building where a loud ring is required.

No. 199—For magneto system, 1,000 or 1,600 ohm ringer, each $7.50

No. 299—For common battery system, 1,000 or 1,600 ohm ringer, each $8.00

Increase Your Rental Income with Extension Bells

A RENTAL charge of 25 to 50 cents a month extra soon pays for these handy extension bells. Many of your subscribers are in need of such bells and can be easily induced to allow you to install them.

The two bells shown here are very popular. They are handsomely finished and guaranteed to give perfect service. Sell your subscribers on the idea and get in on these extra profits.

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GENOA, ILL.

mission. They applied to the Nebraska State Railway Commission, and have been informed that while that body has control over the service of the company, that control ceases at the state line.

An effort will be made to secure the good offices of the Nebraska commission in inducing the company to give relief.

Summary of Commission Rulings and Schedule of Hearings.

INTERSTATE COMMERCE COMMISSION.

October 27: Order issued approving the acquisition by the Ohio Bell Telephone Co. of the properties of the Cedarville Telephone Co., of Cedarville, Ohio.

October 27: Certificate issued approving the acquisition by the Ohio Bell Telephone Co. of the properties of the West Jefferson Home Telephone Co., of Jefferson, Ohio.

CALIFORNIA.

November 3: The West Coast Telephone Co. of California, operating in Siskiyou, Del Norte and Humboldt counties, applied for authority to abandon a telephone line from Prather Ranch to Montague, and a telephone line from Ager to Dorris. It is proposed to abandon the toll station at Little Shasta, Martins Ranch, Mills Ranch, Montague, Prather Ranch, Terwillinger, Hudson Mill, Loosely Mill, Ager, Bogus, Klamath, Hot Springs, McKenzie, Secret Springs, Willow Ranch and Willow Creek.

ILLINOIS.

October 21: Order approved extending until April 25, 1931, period of suspension of the proposed rates for service in Chester, county of Randolph, stated in rate schedule I. C. C. 2 of the Illinois Commercial Telephone Co.

October 22: Application filed by the Martinsville Telephone Co. for authority to suspend for November, 1930, that part of its current schedule of rates and charges now on file with the commission, pertaining to the service connection charge of $3.50 applicable to Martinsville.

October 22: Application filed by the Arthur Mutual Telephone & Telegraph Co. for permission to suspend for the month of November, 1930, that part of its current schedule of rates and charges now on file with the commission, pertaining to the service connection charge of $3.50 applicable to its Arthur exchange.

October 22: Application filed by the Atwood Mutual Telephone Co. for permission to suspend for the month of November, 1930, that part of its current schedule of rates and charges now on file with the commission, pertaining to the service connection charge of $3.50 applicable to its Atwood exchange.

October 22: Application filed by the Illinois Consolidated Telephone Co. for authority to suspend for November, 1930, that part of its current schedule of rates and charges now on file with the commission, pertaining to the service connection charge of $3.50 applicable to Taylorville, Pana, Nokomis, Hillsboro, Litchfield, Morrisonville, Edinburg, Stonington, Owaneco, Butter, Raymond, Waggoner, Irving, Harvel, Witt, Farmersville and Kincaid.

October 22: Order approved authorizing the Sparta Telephone Co. to place in effect the schedule of rates on file with the commission designated as I. C. C. 5, covering telephone service at Sparta, county of Randolph and vicinity, providing for the following rates per year: Individual business, $39; individual residence, $30; two-party business, $36; two-party residence, $27; rural business, $27; rural residence, $15.

Switching service is to be $9 per annum, provided the schedule of rates is amended to include a rule which will provide that wall and desk telephones will be considered standard equipment to be furnished at the option of its customers within the initial rate area at the authorized exchange service rates; schedule to become effective only after rehabilitation of both city and rural plant is completed and the exchange service is converted from magneto to common battery.

November 7: Proposed increases in rates for service in Princeville, Peoria county, scheduled by the Illinois Central Telephone Co., suspended until March 21, 1931.

KANSAS.

October 21: Application by the Western Telephone Corp. for a certificate of convenience and authority to transact the business of a public utility in the towns of Cimarron, Copeland, Montezuma, Ingalls and Pierceville, granted.

November 21: Hearing at Wilmore on application by F. L. Metzker for an order directing C. J. Ray, manager, Wilmore Telephone Co. at Wilmore, to restore complainant to Brown line or line No. 1350.

November 25: Hearing at Princeton on application by the Princeton Mutual Telephone Co., for permission to discontinue free toll service between Princeton and Rantoul.

MICHIGAN.

November 18: Hearing on citation of the Michigan Bell Telephone Co. by the commission on November 1 to show cause why the company's entire rate structure should not be revised. Notice was also served on all cities and communities subscribing to the Michigan Bell service.

November 19: Hearing on citation by the commission on November 6 of the East Shore Telephone Co., at Lakeside, to show cause why it should not abandon long distance service in its community to some other company. Meanwhile the commission is permitting the Michigan Bell Telephone Co. to provide temporary service.

MISSOURI.

October 20: Application filed by the Middle States Utilities Co. of Missouri for authority to file a new schedule of rates for service at Kingston.

October 24: Application filed by the Ozark Central Telephone Co. for authority to issue securities.

October 28: Application of Western Telephone Corp. of Missouri to issue $216,000 of bonds, approved with certain changes.

October 30: Application filed by the Galt Telephone Co. for authority to file a new schedule of rates for service at Galt, Spickard, Tindall, Osgood and Dunlap.

November 5: Application filed by the Stover Telephone Co. for permission to file a new rate schedule, and rules and regulations for exchange service.

NEBRASKA.

November 5: Application filed by Crownover Telephone Co., of Sargent, for authority to increase rate schedules to take care of heavier enforced investments.

November 6: In the matter of the application of the Smithfield Mutual Telephone Co. for validation of unauthorized issue of stock; it appearing that this was done inadvertently and without knowledge of the fact that the law requires commission approval, application granted as asked.

November 7: Authority granted to Northwestern Bell Telephone Co. to eliminate present charge of $10 for installing special equipment for deaf subscribers, and to reduce rates for such service, recent improvements making it possible and desirable to make reductions.

November 7: In the matter of the application of the Fordyce Telephone Co. for authority to publish a 25-cent monthly increased rate for monotype service, that being standard rate for added convenience.

NORTH DAKOTA.

October 2: Application of the Upham Telephone & Electric Co. for permission to increase its telephone rates at Upham, granted.

October 22: Application filed by the Rocky Ridge Telephone Co. of Scranton, for authority to dismantle 1¾ miles of telephone line in Bowman county.

October 29: Application filed by the Oliver-Mercer Telephone Co. for authority to dismantle telephone lines in Township 144, Range 85, Mercer county.

PENNSYLVANIA.

November 3: Complaint dismissed of Armstrong Cork Co. against Bell Telephone Co. of Pa. alleging to be unjust and unreasonable the new rate of $5 per mile air-line measurement for "tie line" or leased circuits as against the old rate of $4 per mile route measurement.

Condensed Telephone News

Companies Are Urgently Requested to Forward to Us Promptly News Concerning Construction, Rebuilding, Financing, Election of Officers, Sales and Purchases of Exchanges or Other Activities

New Incorporations and New Telephone Companies.

BLOOMINGTON, ILL.—The Wabash Telephone Co., a $3,000,000 corporation, has been granted a charter by the secretary of state to construct and operate telephone lines in McLean, Edgar and Clark counties and will have main offices in this city.

Incorporators of the concern are T. C. Ainsworth, manager of the Kinloch-Bloomington Telephone Co.; J. G. Crane, Ranford Dunlap, V. E. Chaney and H. M. Cox, Kansas City, Mo.; A. L. Staderman, Terre Haute, Ind. The company anticipates an annual income of $381,000 in Bloomington and Normal, and $99,000 in Paris.

REDDING, IOWA—A corporation charter has been granted the Farmers & Merchants' Mutual Telephone Co., with a capital stock of $2,400. Dave Tenant is president and E. E. Edwards, secretary.

SORUM, S. D.—The Sorum Telephone Co. has filed articles of incorporation with the secretary of state, listing $25,000 capital stock.

Incorporators are C. M. Sorum, George J. Bagley and Otto Jensen of Sorum; C. F. Medin and H. N. Anderson of Strool; George M. Elling of Slim Buttes, and Charles E. Laflin of Govert.

WALL, S. D.—To operate a telephone system in Wall and surrounding territory, the Cheyenne Valley Electric Co. has been incorporated with $10,000 capital stock.

Incorporators are W. C. Jvens, Scribner, Neb.; C. E. Dowling, Sioux Falls, and Joseph Herink, Wall.

Franchises.

CASCADE, IOWA—Voters of Cascade have

Open Wire Construction—General Notes.

Method of Dead-Ending Wires.

The preferred method of dead-ending wires is by means of a half-sleeve as shown in Fig. 1. Hand make-ups should have two turns around the glass insulator instead of one as shown for the sleeve method. See Fig. 2.

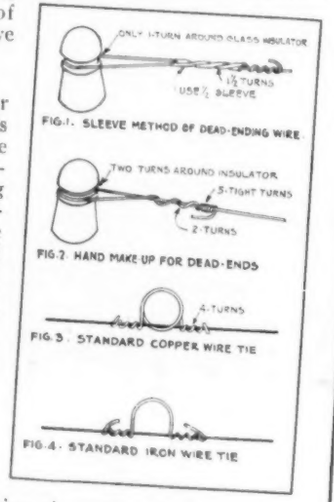


FIG. 1. SLEEVE METHOD OF DEAD-ENDING WIRE.
FIG. 2. HAND MAKE UP FOR DEAD-ENDS
FIG. 3. STANDARD COPPER WIRE TIE
FIG. 4. STANDARD IRON WIRE TIE

Wire Ties.

The standard method for tying-in copper wire is shown in Fig. 3. The tie wire for No. 12 (.104) copper should be 19 inches long and of the same size, soft-annealed wire. Copper tie wires are usually purchased cut to the proper length and packed in 50-pound bundles. As there are 19 tie wires of .104 copper to the pound, there are 950 wires in the standard 50-pound bundle.

The iron wire tie is shown in Fig. 4. Note that the diagram shows the ends of the tie bent back on the twist. This method has an advantage over the practice of cutting the wire off close to the line wire; that of permitting the line wire to be readily untied when required and without the attendant danger of nicking the line wire as is the case where it is cut off close and pliers must be used to untie it. Scrap line wire can be used for iron wire ties (B. B.) and should be cut to a length of 14 inches.

Line wires should be tied on the side of the insulator toward the pole, except the pole pair which should be tied on the side away from the pole in order to give more climbing space between the pole pair wires.

Where there is a side strain on a wire, it should be placed so the strain will be against the insulator and not against the tie wire.

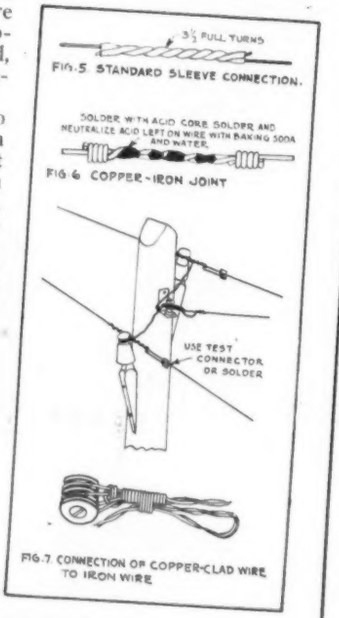
Wire Splices.

The only satisfactory method of splicing line wire is by means of sleeves. A sleeve, if properly placed, provides an excellent mechanical and electrical joint. Sleeves which are placed without first cleaning the line wire, are apt to be as troublesome or more so than hand joints.

The line wire can best be cleaned by means of a small piece of emery cloth about 3 inches square. The cloth should be bent around the wire and rubbed back and forth, being held between thumb and index finger and rotated around the wire so as to brighten it on all sides. Fig. 5 illustrates the correct method of making a sleeve joint.

Care should be taken to avoid placing iron wire sleeves on copper wire lines, or copper sleeves in iron wire lines. Even though the line wires be thoroughly cleaned, there is a good chance that a copper-iron joint will go bad, due to chemical action between the unlike metals.

Where it is necessary to make a copper-iron joint, a Western Union hand joint should be made and then soldered as shown in Fig. 6. This precaution should also be observed in bridging copper-clad service drops onto iron line wire. This sort of connection should preferably be made by means of a good test connector, or by soldering, Fig. 7.


3½ FULL TURNS
SOLDER WITH ACID CORE SOLDER AND NEUTRALIZE ACID LEFT ON WIRE WITH BAKING SODA AND WATER.
USE TEST CONNECTOR OR SOLDER
FIG. 5. STANDARD SLEEVE CONNECTION.
FIG. 6. COPPER-IRON JOINT
FIG. 7. CONNECTION OF COPPER-CLAD WIRE TO IRON WIRE

The writer, when investigating transmission complaints, has found dozens of cases caused by copper-clad drop wires attached to iron line wire by a hand connection. Regardless of how well the conection may be made, it is almost sure to go "high" in time unless soldered. The steel core of copper-clad drop wire also makes difficult a good hand connection, as the springiness of the steel gives it a tendency to untwist.

Transpositions.

Physical transpositions can be made either with a two-piece insulator and 9-inch pin, or by means of a galvanized drop bracket.

Drop brackets provide a transposition that is less liable to give trouble and there is less shunt leakage than with the two-piece transposition insulator. Drop brackets are generally used on toll lines and the two-piece insulator on rural lines.

Phantom transpositions can be made on "three-point" brackets which utilize one pin on the arm and three pins on the galvanized steel bracket. "Four-point" brackets are available but are less popular than the three-point. Figs. 8 and 9 illustrate the method of making both physical and phantom transpositions. It should be kept in mind that there are four distinct types of phantom transpositions, known as types 1, 2, 3, and 4. The uses of these four types of phantom transpositions will be discussed in a future data sheet on transposition design.

In connection with bracket leads which carry several circuits, or even single-circuit bracket leads which may be involved in an inductive exposure, it is essential that the arrangement and spacing of the brackets on the poles be uniform. Failure to follow this rule will result in leads which are difficult to balance against crosstalk and inductive noise by means of transpositions.

It is standard practice to transpose telephone circuits by what is referred to as the "left-over-right" method; that is, the left-hand wire goes over the right-hand wire rather than under when making a transposition. The distinction between left and right-hand wires is, of course, fixed by the fact that pins are numbered and lines designated on the assumption that we have our back to the exchange out of which the lines work. The lines will work equally well regardless of which way we roll the transpositions; however, it is a good idea to follow standard methods.

It is often necessary to cut phantom transpositions in existing open-wire leads. This can be easily accomplished by using four pairs of slack blocks. The blocks are placed on the proper wires in each direction and the wires are then cut and spliced together. It is usually necessary to cut in a small section of wire, although sufficient slack may exist in the lead to permit splicing without this.

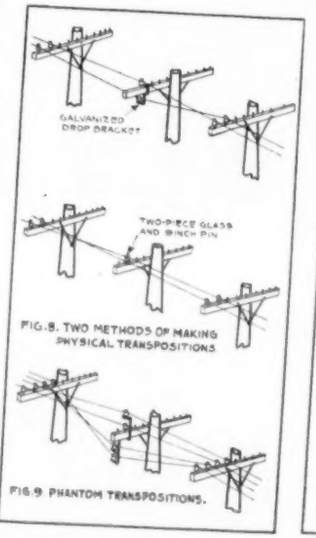


FIG. 8. TWO METHODS OF MAKING PHYSICAL TRANSPOSITIONS
FIG. 9. PHANTOM TRANSPOSITIONS.

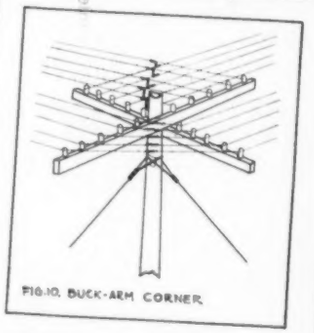
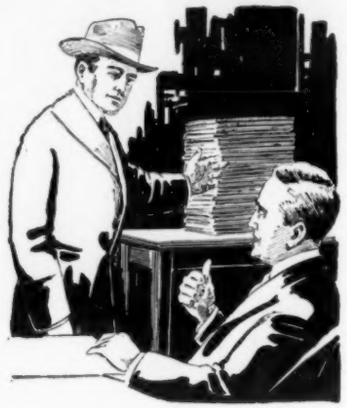


FIG. 10. BUCK-ARM CORNER

Buck-Arm Corners.

It is usually desirable to make open-wire corners on two poles so as to keep the wires under strain. Where this is not possible, buck-arms should be used. Fig. 10 shows how the wires are arranged on this type of corner.

Such a corner, if properly made, will never be a source of transmission complaints. The wire connections at these corners should preferably be soldered, thus eliminating any chance of future "high" joint trouble.



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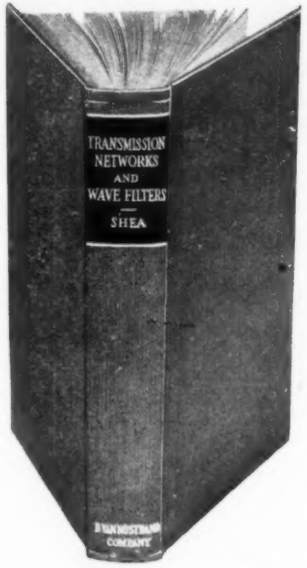
By

T. E. SHEA, B. S., M. S.

Member of the Technical Staff, Bell Telephone Laboratories



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approved a 25-year franchise for the Iowa Telephone & Telegraph Co., the totals being 91 to 61. New lines will be erected here.

SWEA CITY, IOWA.—A 25-year franchise for the Swea City Rural Telephone Co. has been approved at a special election by a vote of 112 to 32. By obtaining the franchise, the Swea City company is in a position to install its own exchange in case it is considered desirable at some future time.

Elections.

OBLONG, ILL.—The annual election for directors of the Oblong Telephone Co. was recently held, and O. R. Smith and Ed Henry were elected, Mr. Henry succeeding E. L. Cortelyou.

The board of directors later elected Otto Walters to succeed W. R. Wall as general manager and secretary. Mr. Wall retires after having served in the capacity of general manager for approximately 20 years.

D. G. Walters was reelected president and W. E. Sloan was chosen as treasurer to succeed Otto Walters.

CHARLSON, N. D.—A stockholders' meeting of the Independent Telephone Co. of McKenzie County was held recently. O. K. Holm, Jay Grantier and B. L. Moe were reelected directors; Hjalmer Nedson was elected president; Frank Keogh, vice-president; O. K. Holm, treasurer, and Charles Mogen, secretary.

WILTON, WIS.—Stockholders of the Ontario & Wilton Telephone Co. held a meeting recently and elected new officers and transacted other business.

Christ Hett was chosen president; Louis Clair, vice-president; Howard Teasdale, Jr., secretary; and Senator Teasdale, treasurer. Howard Teasdale, Jr., will have the active business management of the company.

Senator Teasdale announced he had rebought stock of the company sold to C. A. Blanchard a few years ago. Arrangements are being made to build up the lines and service in the hope that many of the subscribers who ordered their telephones removed two years ago will reinstall them. A copper line has already been built to Sparta and Ontario.

Financial.

LANCASTER, N. H.—The Coos Telephone Co. has notified all holders of its 20-year 6 per cent debenture bonds, due December 1, 1943, to present them with unpaid coupons attached, on December 1, 1930, at the Lancaster National Bank for redemption.

Upon presentation of these bonds, the principal amount, interest to date, and premium will be paid.

The notice sent out by President Geo. H. Dresser stated that on December 1, 1930, all interest would cease to accrue upon the debenture bonds and the coupons for interest maturing subsequent to that date will be void.

Construction.

BLOOMFIELD, IOWA—The board of directors of the Citizens' Mutual Telephone Co. voted at a recent meeting to erect a new building to house the company and to purchase a new switchboard for the system, work to be started on it at once.

The building is to be a two-story structure with a basement. Brick and tile are to be used in its construction.

Miscellaneous.

CHICAGO, ILL.—The Telephone Securities Co. has appointed Charles P. Dake manager of its customer ownership department. This organization handles the financing for the Theodore Gary Tele-

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phone interests, one of the oldest and largest Independents in the field.

Mr. Dake has been engaged in similar work with the United Public Service Co. prior to acquisition by the Middle West Utilities system and for the Central Public Service properties.

SHELBYVILLE, IND.—Ernest A. Pattison, 48 years old, owner of the Blue Ridge Telephone Co., died recently following a long illness.

ALLERTON, IOWA—Relative to the telephone situation here, M. L. Golladay, general manager of the Middle States Utilities Co., gives these facts:

The Allerton Mutual Co. was organized as a competitor of the Middle States Utilities Co. of Iowa and not the Northwestern Bell company for the Bell company never had an exchange in Allerton. The Middle States Utilities Co. purchased a rundown, open-wire, grounded magneto system, rendering very poor service. It then purchased ground, erected a fireproof building, installed a common battery switchboard and telephones, with an underground cable plant; and increased the rates from $1.50 business, $1.00 residence and $1.00 rural to $2.50 business, $1.75 residence and $1.50 rural, net rates.

A few of the subscribers organized a mutual company as a protest against these rates and applied to the Northwestern Bell Telephone Co. for long distance connection. The Northwestern Bell Telephone Co. refused this on the ground that it had an exclusive contract with the Middle States Utilities Co. for the service. Hence the statement that the Bell company has refused to provide service into or out of the community is an error as the Northwestern Bell Telephone Co. is continuing to furnish the Middle States Utilities Co.'s exchange with all the service the community desires.

ONTONAGON, MICH.—G. W. Stannard, manager of the Ontonagon County Telephone Co., has announced that the public utilities commission has approved of all-night service for users of telephones in the company's territory. He stated that service would start about November 15, with an additional cost of 33⅓ cents per month for each telephone.

The announcement was received with a great deal of satisfaction. For years the people here have desired all night telephone service.

REDWOOD FALLS, MINN.—The Redwood Falls Telephone Co. has purchased the Woodlake Telephone Co. of Woodlake, Minn.

The lines of the company will be placed in underground conduits. A contract has been let for digging 6,000 feet of conduit trench in Woodlake.

BLYTHEDALE, MO.—The Blythedale Telephone Co. under a receivership since in April of 1929, was set back on its own feet the latter part of October. An order was made in circuit court releasing the receivers, A. T. Trammell and J. C. McWhinney, and directing the company to elect a new board of directors to take charge of its affairs.

A motion asking for the removal of the receivers was made by 31 stockholders of the company. They asserted that the business had been operated at a loss since the receivers took it over; that they were not the proper ones to manage it; that it was in worse condition than when the receivership was begun; that the receivers had not made reports of its condition available to the stockholders, and that the management had been conducted with personal gain.

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